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THE PHILIPPINE

JOURNAL OF SCIENCE

C. BOTANY

Vol. III FEBRUARY, 1908 No. 1

THE SYMPLOCACEÆ OF THE PHILIPPINE ISLANDS.

By A. Brand.

(*Frankfort a. d. Oder, Germany.*)

The first species of *Symplocos* from the Philippines, *S. patens* and *S. ciliata*, were described by *C. Presl* in 1831 in Reliquiæ Haenkeanæ, but an examination of the types preserved in the Vienna Herbarium has shown that they are but forms of one species, for which the name *S. patens* was retained in my monograph of the family published in 1901. Although *Presl's* descriptions are very complete, the species fell into oblivion, and it was not considered by *A. DeCandolle* in the Prodromus, nor by *Vidal* in his publications on Philippine botany, nor in Index Kewensis. There can be no doubt but that the specimens on which the species was based were really collected in the Philippines, for the section of the genus to which it belongs does not occur in tropical America, to which region some of the species credited by *Presl* to the Philippines must be referred.[1]

In 1851 *Presl* described the next Philippine species of the genus, but did not recognize it as belonging to *Symplocos*, naming it *Carlea oblongifolia*. In 1880–1883 *F.-Villar* in his Novissima Appendix erroneously credited to the Philippines *S. racemosa* Roxb., while *Vidal* in 1885 erroneously credited *S. spicata* to the archipelago. In 1886 *Vidal* described *Symplocos Villarii* and *S. pseudospicata*, but in the Pflanzenreich both were reduced to *S. polyandra* Brand. *Vidal* also transferred to *Symplocos, Presl's Carlea oblongifolia* and described also *S. montana,* to which *Rolfe* gave the name *S. luzoniensis;* thus up to the end of the year 1886 but four valid species of the genus were known from the archipelago.

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[1] Merrill: *This Journal* (1906), 1, *Bot. Suppl.*, 308.

In my monograph of the family[2] the number of species of Philippine *Symplocos* was increased to seven, two additional species being described, *S. floridissima* and *S. Cumingiana;* and *S. ferruginea,* a well-known species of the Indo-Malayan region, was credited to the archipelago. Since botanical work has been prosecuted by the Americans, considerable progress has been made, and in the present paper no less than 16 species are considered, of which thirteen are found in Luzon, nine being endemic to this island. Two species are found in Mindanao, *S. confusa* and *S. Ahernii,* both being also found in Luzon, but not yet known from the intermediate islands. The Island of Palawan (Paragua) has three species, of which two, *S. palawanensis* and *S. Foxworthyi,* are new and confined to that island, the third, *S. oblongifolia,* being rather widely distributed in the archipelago. Of the following smaller islands but single species are known from each: Dinagat, *S. ferruginea* var. *philippinensis;* Culion, Dumaran, and Guimaras, *S. oblongifolia;* Mindoro, *S. adenophylla* var. *Merrittii;* Panay, *S. depauperata* var. *sordida.* Of the 16 species found in the Philippines but one extends beyond the limits of the archipelago, *S. confusa,* a species not rare in the Malayan region; the remaining 15 species being endemic, at least in their peculiar Philippine varieties.

As in other regions, most of the species found in the Philippines grow at the higher altitudes, the highest point in the archipelago at which *Symplocos* has been found being near the summit of Mount Halcon, Mindoro, where *S. adenophylla* var. *Merrittii* grows at an altitude of about 2,500 meters above the sea. Three species, *S. patens, S. polyandra,* and *S. oblongifolia,* are found at lower elevations, from 10 to 600 meters above the sea, and it is rather remarkable that these low-country species have the largest leaves.

I am greatly indebted to Mr. *Merrill,* who has sent me all the *Symplocos* material preserved in the herbarium of the Bureau of Science, and most of the present paper is based on this extremely valuable collection. Descriptions of all the species have been given, as from the abundant material at hand it has been possible to amend and amplify the descriptions of species previously considered.

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[2] Pflanzenreich, 6 (IV, 242), (1901), 1-100.

CONSPECTUS SPECIERUM.

I. Sectio **Cordyloblaste** (Moritzi) Benth. et Hook. *f.* Gen. Pl., **2** (1876), 669; Brand in Pflanzenreich, **6** (1901), 88. Genus *Cordyloblaste* Moritzi in Bot. Zeitg., **6** (1848), 606.

Stamina monadelphia, in tubum longum fere usque ad antheras connata; filamenta complanata; tubus stamineus tubo corollae coalitus.

1. **Symplocos confusa** Brand in Pflanzenreich, **6** (1901), 88; Merrill in Philip. Journ. Sci., **1** (1906), Suppl. 115. *S. Henschelii* Benth. et Hook. f. ex Clarke in Hook. f. Fl. Brit. Ind., **3** (1882), 588, *syn. excl.*

Arbor ramulis sordide ferrugineis. Folia tenuiter coriacea, 7–11 cm. longa, 2.5–3.5 cm. lata, forma variabili, nunc ovalia, nunc lanceolato-oblonga, sub-integra, utrimque glaberrima, apice acuminata, basi cuneata. Racemi simplices axillares sericei 1–4-flori, subumbellati, longitudine petioli; bracteae lanceolatae, hirsutae; corolla alba, calyce sericeo 4–5-plo longior, paulo ultra medium connata, lobis 5; stamina quadriserialia, exteriora apice libera; ovarium triloculare vel abortu saepissime biloculare, villosum. Fructus ca. 11 mm. longus, niger, adpresse incano-pilosus, oblongo-ovoideus, disco lobos calycinos distincte superante.

LUZON, Province of Bataan, Mount Mariveles (3240, 3723, 3960 *Merrill*), October, January, 1903–04; (1185, 1343 *Whitford*) March, September, 1905; (For. Bur. 791 *Borden*) May, 1904; (For. Bur. 2619 *Meyer*) February, 1905; (Bur. Sci. 1578 *Foxworthy*) October, 1906: District of Lepanto, near Balbalasan (For. Bur. 5726 *Klemme*) November, 1906: Province of Benguet, Mount Tonglon (4827 *Merrill*) November, 1905; (For. Bur. 5033 *Curran*) August, 1906. MINDANAO, Province of Misamis, Mount Malindang (For. Bur. 4699 *Mearns & Hutchinson*) May, 1906.

A small tree 2 to 6 meters high, the trunk 1.5 to 6 centimeters in diameter, with white fragrant flowers, growing on rocky exposed forested ridges from an altitude of about 900 to about 2,500 meters above the sea, widely distributed in Luzon.

Malayan Peninsula, southern China, and Borneo.

2. **S. Foxworthyi** Brand, sp. nov.

Frutex densissimus, ramulis glabris. Folia crasse coriacea, 4–6.5 cm. longa, 3–4 cm. lata, obovata vel fere orbicularia, utrimque glaberrima, integerrima, apice rotundata vel subcordata, basi cuneata, costa supra impressa, nervi secundarii inconspicui; petiolus rubro-brunneus, 6 mm. longus. Flores in racemis brevibus, subsexfloris; pedicelli et calyx sericei, pedicelli inferiores calyce subbreviores; corolla glabra, calyce triplo longior, lobis 6 vel 7, paulo supra medium coalitis; stamina usque ad antheras coalita, triserialia; stylus inferne pilosus; ovarium albido-villosum, biloculare vel abortu uniloculare.

Represented by Nos. 552 (type) and 558 Bureau of Science, collected by *F. W. Foxworthy* on Mount Pulgar, PALAWAN, in flower, March, 1906, at an altitude of 1,150 to 1,210 meters.

A dense shrub with grayish bark, reaching a height of 2.5 meters, the flowers white or pinkish-white and with a faint odor. Probably the ovary of this species was originally 3-celled, as in *S. confusa* and *S. Henschelii*, as in one of the ovaries examined I found the one cell imperfectly divided by an interrupted wall. Common name *Arctukt*.

II. Section **Bobua** (DC.) Brand in Pflanzenreich, **6** (1901), 32. Genus *Bobua* DC. Prodr., **3** (1828), 23.

Stamina ± distincte pentadelphia, basi tantum vel paulo supra basin connata; filamenta filiformia.

A. **Inflorescentiae compositae.**
a. **Corolla extus sericea.**
α. **Folia basi cuneata** .... 3. *S. patens*.
β. **Folia basi rotundata** .... 4. *S. floridissima*.
b. **Corolla extus glabra.**
α. **Stamina ca. 100** .... 5. *S. polyandra*.
β. **Stamina 25–50.**
I. **Fructus globosus.**
1. **Inflorescentiae axillares, a basi furcatae, foliis superatae.** 6. *S. ferruginea*.
2. **Inflorescentiae terminales, paniculatae, folia excedentes.** 7. *S. Ahernii*.
II. **Fructus ellipsoideus** .... 8. *S. adenophylla*.

B. **Inflorescentiae simplices.**
a. **Flores sub foliis prominentes** .... 9. *S. oblongifolia*.
b. **Flores in axillis foliorum.**
α. **Ramuli glabri.**
I. **Folia chartacea** .... 10. *S. betula*.
II. **Folia coriacea.**
1. **Folia 6–11 cm. longa** .... 11. *S. Cumingiana*.
2. **Folia 3–5.5 cm. longa** .... 12. *S. Whitfordii*.
β. **Ramuli ferruginei vel pilosi.**
I. **Folia pleraque plus quam 4 cm. longa.**
1. **Folia coriacea** .... 13. *S. luzoniensis*.
2. **Folia chartacea** .... 14. *S. Merrilliana*.
II. **Folia pleraque minus quam 4 cm. longa.**
1. **Folia utrimque glaberrima** .... 15. *S. palawanensis*.
2. **Folia ± pilosa** .... 16. *S. depauperata*.

3. **S. patens** C. Presl Rel. Haenk., **2** (1831), 61; Brand in Pflanzenreich, **6** (1901), 34.

Arbor magna ramulis ferrugineis. Folia coriacea vel (juniora) chartacea, 12–16 cm. longa, 4–7.5 cm. lata, oblonga vel elliptica, serrata vel integerrima, breviter apiculata, basi cuneata vel (raro) subrotundata; petiolus ca. 2 cm. longus. Paniculae petiolis 3–6-plo longiores, pedicellis calyce longioribus vel aequilongis; bracteae lanceolatae, hirsutae, calyx ferrugineus, lobis rotundatis tubum aequantibus; corolla calyce duplo longior, 5-partita; stamina ca. 100, corolla subbreviora; ovarium pilosum. Fructus ca. 8–10 mm. longus, ovoideus, superne paulo angustatus, brunneus, sub lente brevissime hirtellus, lobis calycinis discum subpatenter superantibus.

FORMAE.

Folia subtus ad costam tantum pilosa .... forma 1, *eu-patens*
Folia subtus glaberrima .... forma 2, *ciliata*
Folia subtus ubique ferrugineo-hirta.. forma 3, *Elmeri*

Forma 1, **eu-patens** Brand. *S. patens* C. Presl, *sensu strictissimo.*

LUZON (152 *Haenke*), type of *Symplocos patens* Presl. Province of Rizal (For. Bur. 2670 *Ahern's collector*) January, 1905; (Bur. Sci. 2080 *Ramos*) February, 1907.

Forma 2, **ciliata** (C. Presl) Brand. *S. ciliata* C. Presl, *l. c.*

LUZON (153 *Haenke*).

This form has not as yet been rediscovered by the American botanists.

Forma 3, **Elmeri** Brand. *S. Elmeri* Brand in Perk. Frag. Fl. Philip. 1, (1904), 36; Merrill in Philip. Journ. Sci. 1, (1906), Suppl. 115.

LUZON, Province of Rizal, Tanay (2358 *Merrill*) May, 1903: Province of Bataan, Mount Mariveles (1333 *Whitford*) May, 1905, (For. Bur. 2718 *Borden*) February, 1905.

A large tree reaching a height of 30 meters and the trunk a diameter of 55 centimeters, with white fragrant flowers, growing on forested slopes and ridges from 150 to 600 m. above the sea in Rizal and Bataan provinces, Luzon. Common names, according to Presl, *barangau* and *rigangaian; byas babaye* according to H. N. Whitford. Fruit green, brown when dried.

Endemic.

4. **S. floridissima** Brand in Pflanzenreich, 6 (1901), 35.

Arbor (?) ramulis ferrugineis vel glabratis. Folia tenuiter coriacea, 10--12 cm. longa, 3–5.5 cm. lata, ovalia vel elliptica, integerrima, utrimque glabra, in apicem longum sensim producta. Paniculae ferrugineo-hirtae petiolo longiusculo 4–6-plo longiores, pedicellis calycem subaequantibus; bracteae parvae lanceolatae; calyx dense ferrugineus, lobis triangularibus tubum subaequantibus.

LUZON, Province of Albay (1305 *Cuming*) 1836-40, a species not as yet rediscovered by the American botanists.

5. **S. polyandra** Brand in Pflanzenreich, 6 (1901), 36; Perkins Frag. Fl. Philip. 1 (1904), 37; Merrill in Philip. Journ. Sci. 1, (1906), Suppl. 115. *S. Villarii* Vidal Rev. Pl. Vasc. Filip. (1886), 178. *S. pseudo-spicata* Vidal, *l. c.*, 179.

Arbor ramulis glabris. Folia coriacea, valde variabilia, 8–15 cm. longa, 3–4.5 cm. lata, oblonga vel elliptica, serrata vel subintegerrima, utrimque glaberrima, apiculata, basi cuneata. Paniculae tomentosae, dein glabratae, petiolo 1.5–2.5 cm. longo 4–6-plo longiores, floribus nunc sessilibus nunc pedicellatis; bracteae minimae; calycis lobi triangulares tubo subaequilongi; corolla calyce triplo longior; stamina ca. 100, corolla subbreviora; ovarium pilosiusculum. Fructus 8–10 mm. longus, ovoideo-ampulliformis, glaber, viridis vel laete brunneus, exocarpio crassiusculo fragili, lobis discum superantibus, semen incurvum.

LUZON, Province of Rizal, Antipolo (1697 *Merrill*) March, 1903; Bosoboso (For. Bur. 1114, 1974, 2662, 3253 *Ahern's collector*) June, January, August, 1905 (Bur. Sci. 1489 *Ramos*) Sept., 1906: Province of Tayabas, Pagbilao, (1949 *Merrill*) April, 1903: Province of Bataan, Lamao River (For. Bur. 70, 170 *Barnes*) January, 1904: (For. Bur. 1925 *Borden*). September, 1904: Province of Zambales, Subic

examined I found the one cell imperfectly divided by an interrupted wall. Common name *Aretukt.*

II. Section **Bobua** (DC.) Brand in Pflanzenreich, **6** (1901), 32. Genus *Bobua* DC. Prodr., **3** (1828), 23.

Stamina ± distincte pentadelphia, basi tantum vel paulo supra basin connata; filamenta filiformia.

A. Inflorescentiae compositae.
a. Corolla extus sericea.
α. Folia basi cuneata ... 3. *S. patens.*
β. Folia basi rotundata ... 4. *S. floridissima.*
b. Corolla extus glabra.
α. Stamina ca. 100 ... 5. *S. polyandra.*
β. Stamina 25-50.
I. Fructus globosus.
1. Inflorescentiae axillares, a basi furcatae, foliis superatae. 6. *S. ferruginea.*
2. Inflorescentiae terminales, paniculatae, folia excedentes. 7. *S. Ahernii.*
II. Fructus ellipsoideus ... 8. *S. adenophylla.*

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b. Flores in axillis foliorum.
α. Ramuli glabri.
I. Folia chartacea ... 10. *S. betula.*
II. Folia coriacea.
1. Folia 6-11 cm. longa ... 11. *S. Cumingiana.*
2. Folia 3-5.5 cm. longa ... 12. *S. Whitfordii.*
β. Ramuli ferruginei vel pilosi.
I. Folia pleraque plus quam 4 cm. longa.
1. Folia coriacea ... 13. *S. luzoniensis.*
2. Folia chartacea ... 14. *S. Merrilliana.*
II. Folia pleraque minus quam 4 cm. longa.
1. Folia utrimque glaberrima ... 15. *S. palawanensis.*
2. Folia ± pilosa ... 16. *S. depauperata.*

3. **S. patens** C. Presl Rel. Haenk., **2** (1831), 61; Brand in Pflanzenreich, **6** (1901), 34.

Arbor magna ramulis ferrugineis. Folia coriacea vel (juniora) chartacea, 12–16 cm. longa, 4–7.5 cm. lata, oblonga vel elliptica, serrata vel integerrima, breviter apiculata, basi cuneata vel (raro) subrotundata; petiolus ca. 2 cm. longus. Paniculae petiolis 3–6-plo longiores, pedicellis calyce longioribus vel aequilongis; bracteae lanceolatae, hirsutae, calyx ferrugineus, lobis rotundatis tubum aequantibus; corolla calyce duplo longior, 5-partita; stamina ca. 100, corolla subbreviora; ovarium pilosum. Fructus ca. 8–10 mm. longus, ovoideus, superne paulo angustatus, brunneus, sub lente brevissime hirtellus, lobis calycinis discum subpatenter superantibus.

FORMAE.

Folia subtus ad costam tantum pilosa.................................... forma 1, *eu-patens*
Folia subtus glaberrima .... forma 2, *ciliata*
Folia subtus ubique ferrugineo-hirta... forma 3, *Elmeri*

Forma 1, **eu-patens** Brand. *S. patens* C. Presl, *sensu strictissimo.*

LUZON (152 *Haenke*), type of *Symplocos patens* Presl. Province of Rizal (For. Bur. 2676 *Ahern's collector*) January, 1905; (Bur. Sci. 2080 *Ramos*) February, 1907.

Forma 2, **ciliata** (C. Presl) Brand. *S. ciliata* C. Presl, *l. c.*

LUZON (153 *Haenke*).

This form has not as yet been rediscovered by the American botanists.

Forma 3, **Elmeri** Brand. *S. Elmeri* Brand in Perk. Frag. Fl. Philip. 1, (1904), 36; Merrill in Philip. Journ. Sci. 1, (1906), Suppl. 115.

LUZON. Province of Rizal, Tanay (2356 *Merrill*) May, 1903: Province of Bataan, Mount Mariveles (1333 *Whitford*) May, 1905, (For. Bur. 2718 *Borden*) February, 1905.

A large tree reaching a height of 30 meters and the trunk a diameter of 55 centimeters, with white fragrant flowers, growing on forested slopes and ridges from 150 to 600 m. above the sea in Rizal and Bataan provinces, Luzon. Common names, according to Presl, *barangaa* and *rigangaian*; *byas babaye* according to H. N. Whitford. Fruit green, brown when dried.

Endemic.

4. **S. floridissima** Brand in Pflanzenreich, 6 (1901), 35.

Arbor (?) ramulis ferrugineis vel glabratis. Folia tenuiter coriacea, 10–12 cm. longa, 3–5.5 cm. lata, ovalia vel elliptica, integerrima, utrimque glabra, in apicem longum sensim producta. Paniculae ferrugineo-hirtae petiolo longiusculo 4–6-plo longiores, pedicellis calycem subaequantibus; bracteae parvae lanceolatae; calyx dense ferrugineus, lobis triangularibus tubum subaequantibus.

LUZON, Province of Albay (1305 *Cuming*) 1836–40, a species not as yet rediscovered by the American botanists.

5. **S. polyandra** Brand in Pflanzenreich, 6 (1901), 36; Perkins Frag. Fl. Philip. 1 (1904), 37; Merrill in Philip. Journ. Sci. 1, (1906), Suppl. 115. *S. Villarii* Vidal Rev. Pl. Vasc. Filip. (1886), 178. *S. pseudo-spicata* Vidal, *l. c.*, 179.

Arbor ramulis glabris. Folia coriacea, valde variabilia, 8–15 cm. longa, 3–4.5 cm. lata, oblonga vel elliptica, serrata vel subintegerrima, utrimque glaberrima, apiculata, basi cuneata. Paniculae tomentosae, dein glabratae, petiolo 1.5–2.5 cm. longo 4–6-plo longiores, floribus nunc sessilibus nunc pedicellatis; bracteae minimae; calycis lobi triangulares tubo subaequilongi; corolla calyce triplo longior; stamina ca. 100, corolla subbreviora; ovarium pilosiusculum. Fructus 8–10 mm. longus, ovoideo-ampulliformis, glaber, viridis vel laete brunneus, exocarpio crassiusculo fragili, lobis discum superantibus, semen incurvum.

LUZON, Province of Rizal, Antipolo (1697 *Merrill*) March, 1903: Bosoboso (For. Bur. 1114, 1974. 2662, 3253 *Ahern's collector*) June, January, August, 1905 (Bur. Sci. 1489 *Ramos*) Sept., 1906: Province of Tayabas, Pagbilao, (1949 *Merrill*) April, 1903: Province of Bataan, Lamao River (For. Bur. 76, 176 *Barnes*) January, 1904: (For. Bur. 1925 *Borden*), September, 1904: Province of Zambales, Subic (*Hallier*), January, 1904.

A large tree 20 to 32 meters high, the trunk 24 to 45 centimeters in diameter, with smooth, dark-gray bark, ascending or wide-spreading branches, and white or yellowish flowers, growing in the lower hill forests and widely distributed in Luzon. Common name *Mahunut*.

Endemic.

Guettarda polyandra Blanco Fl. Filip. ed. 2 (1845), 500, is certainly not the same as *Symplocos polyandra*, as *Blanco's* description does not apply to the above specimens nor to those which *Vidal* named *S. Villarii*, and to which he reduced *Blanco's* species as a doubtful synonym, nor to those upon which I founded *S. polyandra* in the Pflanzenreich. If *Blanco's* species really belongs in *Symplocos*, it can be nothing else than *S. oblongifolia*, to which species his description applies fairly well. Under the circumstances it would perhaps have been better to have retained the name *S. Villarii* for the present species, but as the name *polyandra* has been used in the Pflanzenreich, I have here retained it lest the confusion become still greater. See *Perkins l. c.*

6. **S. ferruginea** Roxb., var. **philippinensis** Brand, var. nov.

Arbor ramulis glabris. Folia coriacea, 6–12 cm. longa, 3–6 cm. lata, obovata vel elliptica, leviter undulata vel serrata, utrimque glaberrima, subtus flavescentia, in apicem longiusculum subito producta, basi cuneata; petiolus 1–1.5 cm. longus. Spicae ferrugineae, densiflorae, petiolo 2–3-plo longiores, fructiferae elongatae; calyx villosus, lobis lanceolato-acutis tubo longioribus; corolla lutea; stamina ca. 60. Fructus nigro-purpurascens, 6 mm. longus, ampulliformis.

LUZON, Province of Benguet, Sablan (6091 *Elmer*) April, 1904; Baguio (6008 *Elmer*) March, 1904. DINAGAT (440 *Ahern*). Common name *Libas-libas*.

A small tree about 6 meters high, branching from near the base, densely branched above, with thin, smooth, brown or light gray or whitish bark, the fruit green when fresh, becoming black in drying. The plant grows along streams in the islands of Luzon and Dinagat. It differs from Malayan and Chinese specimens of *S. ferruginea* in its smaller leaves, more branched inflorescence, and more numerous stamens.

7. **S. Ahernii** Brand sp. nov.

Arbor, rarius frutex, ramulis glabris, purpureo-brunneis. Folia coriacea, 8–9.5 cm. longa, 3–4 cm. lata, elliptica, repando-serrulata, utrimque glaberrima, in apicem longum saepius subfalcatum subito producta, basi cuneata; costa supra impressa; petiolus 1–1.5 cm. longus. Spicae axillares et terminales, paniculatae, albido-sericeae, petiolo 4–6-plo longiores, fructiferae elongatae; bracteae late ovatae, obtusae vel cuspidatae; calycis tubus glaber, lobi sericei, rotundati, tubo sublongiores: corolla alba, rarius lutea, calyce duplo longior; stamina ca. 50, corollam aequantia; stylus et ovarium glabri. Fructus 7–8 mm. longus, ovoideo-ampulliformis, niger, lobis calycinis discum comose superantibus, semen valde incurvum.

LUZON, Province of Bataan, Lamao River (1157, 1196 *Whitford*) March, 1905; (For. Bur. 1511 *Ahern's collector*) July–August, 1904; (For. Bur. 2647 *Meyer*) February 1905: Province of Benguet, Baguio (For. Bur. 4917 *Curran*) August, 1906; Province of Rizal (For. Bur. 3175 *Ahern's collector*) July, 1905. MINDANAO, Province of Misamis, Mount Malindang (For. Bur. 4571 *Mearns and Hutchinson*) May, 1906.

A tree 8 to 15 m. high, the trunk 25 to 75 centimeters in diameter, growing on densely forested slopes at an altitude of from 900 to 1,800 meters above the sea, differing from *S. ferruginea* var. *philippinensis* in its leaves, which are green beneath when dry, and in its inflorescence. Common names: *Gudic* (Province of Benguet); *Banitong babáye* (Province of Bataan); *Tayom-tayom* (Province of Rizal).

8. **S. adenophylla** Wall. var. **Merrittii** Brand, var. nov.

Arbor vel frutex ramulis ferrugineis vel saepe glabratis. Folia coriacea, 4–9 cm. longa, 15–35 mm. lata, elliptica vel obovata, glandulosa, utrimque glaberrima, in apicem longissimum subito protracta, basi cuneata; petiolus 10–15 mm. longus. Inflorescentiae sordide velutinae, petiolo duplo longiores, floribus subsessilibus; calyx sordide velutinus, lobis lanceolato-acutis tubo multo brevioribus; corolla calyce duplo longior; stamina ca. 25; ovarium glabrum. Fructus laete brunneus, glaber, 8–9 mm. longus, ellipsoideus, lobis calycinis disco adpressis.

MINDORO, Mount Halcon (For. Bur. 4406, 4428, 4440, 4447, collected by *M. L. Merritt*) June, 1906; (5752 *Merrill*) November, 1906. *S. adenophylla* Merr. in Philip. Journ. Sci. **2** (1907), Bot., 298.

A shrub or small tree 2 to 3 meters high, the trunk 4 to 5 centimeters in diameter, with yellowish buds. It grows on ridges in dense thickets at an altitude of from 1,500 to 2,450 meters above the sea, differing from Malayan specimens of the species in its broader leaves and somewhat larger fruit.

9. **S. oblongifolia** (C. Presl) Rolfe in Journ. Bot. **23** (1885), 214; Vidal Phan. Cuming. Philip. (1885), 124; Brand in Pflanzenreich, **6** (1901), 55; Merrill in Philip. Journ. Sci., **1** (1906), Suppl. 115. *Carlea oblongifolia* C. Presl Epim. Bot. (1851), 217.

Arbor ramulis apice parce et breviter pilosis. Folia ad apicem ramorum dense conferta, 12–19 cm. longa, 4–6 cm. lata, oblonga, integerrima, utrimque glaberrima, obtusa, basi cuneata. Spicae puberulae, multiflorae, petiolo 4–6-plo longiores; bracteae minimae, subaequales, lanceolato-acutae; calycis tubus ferrugineus, lobi glabrati rotundati tubum subaequantes; corolla calyce 4-plo longior; stamina ca. 60, corolla sublongiora; ovarium glabrum. Fructus 8 mm. longus, brunneus, glaber, cylindricus, trilocularis, lobis calycinis discum patenter superantibus.

LUZON, Province of Bataan, Lamao River (For. Bur. 199 *Barnes*) January, 1904; (For. Bur. 1223, 1246 *Borden*) June, 1904; (For. Bur. 2606 *Meyer*) February, 1905; (133 *Whitford*) May, 1904; Mariveles (For. Bur. 757 *Ahern*) January, 1902; Bur. Sci. (1651 *Foxworthy*) October, 1906; (For. Bur. 6267 *Curran*) February, 1907. GUIMARAS (For. Bur. 269 *Gammill*) January, 1904; (For. Bur. 6482 *Everett*) January, 1907; (For. Bur. 4540. *P. del Villar*) June, 1906. CULION (577 *Merrill*) December, 1902; without locality (1054 *Cuming*) 1830–40 (type).

A tree 6 to 25 meters high, 15 to 40 centimeters in diameter, with straight trunk and full, goblet-shaped top, with gray smooth bark and reddish wood; flowers white and slightly fragrant; fruit green when fresh, brown when dried. It grows in thickets and open dry forests from slightly above sea level (8 meters) to an altitude of 700 meters, the timber being somewhat utilized locally for general construction. Common names *Dituman*, *Puso-puso*, *Buta-buta* (*Bataan*); *Balah-bá-ban* (Guimaras Island).

Endemic.

In regard to the nomenclature of this species, Dr. *C. B. Robinson*, of the N. Y. Botanical Garden, writes to Mr. *Merrill* in March, 1906 as follows: "*Symplocos oblongifolia* cannot stand for the Philippine plant as there is an older *S. oblongifolia* published as such by *Casaretto* in Novarum Stirpium Brasiliensium Decades. It is on page 31, No. 28, and thus in the third decade, which appeared according to itself in August, 1842, the fourth decade being dated October, 1842 * * * *Carlea oblongifolia* of *Presl* did not appear before 1849, and so it requires a new name." Concerning this matter, *Symplocos oblongifolia* Casar., being only a synonym of *S. lanceolata*, requires no new name among those botanists who do not acknowledge the maxim "once a synonym always a synonym."

10. **S. betula** Brand, *sp. nov.*

Arbor, cortice laevi, argenteo-cinereo, ramulis glabris, purpureo-brunneis, striatis. Folia subsessilia, chartacea, 5–8 cm. longa, 2–2.5 cm. lata, oblongo-elliptica, utrimque glaberrima, margine leviter undulata, apice sensim attenuata, basi cuneata vel subrotundata, costa supra impressa. Spicae axillares, simplices, ca. 2 cm. longae, densiflorae; bracteae calycis tubo distincte breviores, calyx glaber, lobis rotundatis tubo paulo brevioribus; corolla alba, calyce triplo longior; stamina ca. 25, corolla sublongiora; stylus claviformis cum ovario glaber. Fructus ignotus.

A tree 4 meters high, the trunk 5 centimeters in diameter, with white fragrant flowers growing on the old crater-rim in dense thickets, at an altitude of 1,000 meters in the Lamao Forest Reserve, Mount Mariveles, Province of Bataan, LUZON, type specimen No. 6283 Forestry Bureau, collected by *H. M. Curran*, February, 1907.

11. **S. Cumingiana** Brand in Pflanzenreich 6 (1901), 58.

Arbor (?) ramulis glabris. Folia 6–11 cm. longa, 2.5–5 cm. lata, valde variabilia, elliptica vel oblonga, leviter undulata, utrimque glaberrima, breviter apiculata in petiolum brevissimum sensim attenuata. Spicae puberulae, 5–8-florae; bracteae sericeae, lanceolato-acutae; calycis tubus subglaber, lobi rotundati sericei; corolla calyce duplo longior; stamina ca. 25; ovarium glabrum. Fructus 11 mm. longus, brunneus, glaber, rugosus, cylindricus, trilocularis, exocarpio tenui.

Specimens previously examined: LUZON, Province of Batangas (1463 *Cuming*): Province of Nueva Ecija, Caraballo Mountains (2133, 2148 *Vidal*): Province of Camarines, Mount Isarog, (3226 *Vidal*).

It is rather strange that this species, which appears to be not uncommon in Luzon, has not as yet been rediscovered by the American botanists.

Endemic.

12. **S. Whitfordii** Brand, *sp. nov.*

Frutex glaberrimus, cortice purpureo-brunneo, striato. Folia coriacea, 3–5.5 cm. longa, 15–25 mm. lata, elliptica vel oblongo-lanceolata, breviter apiculata, basi cuneata, crenata; costa supra impressa; petiolus

flavescens, 5–10 mm. longus. Spicae densiflorae petiolo 3–4-plo longiores; flores plerumque sessiles, infimi interdum breviter pedicellati; bracteae ovatae tubo calycis aequilongae; corolla alba, calyce plus duplo longior; stamina ca. 20, corolla sublongiora; stylus et ovarium glabri. Fructus 8 mm. longus, ovoideus, niger, lobis calycis coronatus.

A shrub 1 to 6 meters high with white fragrant flowers, growing on Mount Banajao, Provinces of Tayabas and Laguna, LUZON, on steep forested slopes from 1,600 to 2,000 meters above the sea, Lucban (962 *Whitford*) October, 1901; Majayjay (Bur. Sci. 2113, 2380, 2391 *Foxworthy*) March, 1907.

13. **S. luzoniensis** Rolfe in Journ. Bot. **24** (1886), 348; Brand in Pflanzenreich **6** (1901), 61. *S. montana* Vidal Rev. Pl. Vasc. Filip. (1886), 179.

Frutex ramulis rufo-setosis. Folia 4–7 cm. longa, 1.5–2.5 cm. lata, lanceolata vel oblongo-lanceolata, crenato-serrata vel serrata, praeter nervum medium setosum glabra; spicae villosae, 4–5-florae, petiolo 2–3-plo longiores; bracteae lanceolatae, villosae; calycis lobi lanceolati; corolla non satis nota; ovarium glabrum. Fructus junior ovoideus, calyce coronatus, glaber, rugosus.

A species not yet rediscovered by the American botanists, the type being from Mount Banajao, Province of Tayabas, Luzon, growing at an altitude of 2,000 meters. With some hesitation I refer also to this species, the type of which I have not seen, a specimen collected by *Vidal* (no. 2141) on the Caraballo Mountains, Province of Nueva Ecija, LUZON. It differs from the species as described, in its minutely denticulate leaves and villous young fruit, and may prove to be a distinct species or a variety, when more material is available for comparison.

14. **S. Merrilliana** Brand, sp. nov.

Arbor ramulis apice pilosis. Folia chartacea, 5–7.5 cm. longa, 2–2.5 cm. lata, elliptica vel oblonga, utrimque glaberrima, repando-serrata, in apicem longum plerumque subfalcatum subito producta, basi cuneata; costa supra impressa; petiolus 5 mm. longus. Spicae sericeae, axillares, simplices, multiflorae, petiolo 4–8-plo longiores; bracteae ovato-acutae, sericeae, calycis tubum occultantes; calyx glaber, lobis oblongis parce sericeis, tubo aequilongis; corolla alba, calyce plus duplo longior, stamina ca. 17 corolla vix longiora; stylus ad basin pilosus; ovarium sericeum. Fructus ovoideo-globosus, 5 mm. longus, in sicco brunneo-flavescens, granulatus, lobis calycinis discum comose occultantibus.

Type specimen no. 2415 Bureau of Science, collected by *F. W. Foxworthy*, on Mount Banajao, Province of Laguna, LUZON, along trail to top of mountain, 1,500 to 2,200 meters above the sea, also no. 870 Forestry Bureau, collected by *W. Klemme*, same locality, June, 1904.

A tree 3 to 5 meters high, the trunk about 10 centimeters in diameter, the flowers white. It is related to *S. lancifolia*, and so considered by Merrill,[3] but distinguished from that species by its longer inflorescence, less numerous stamens, the hairy base of the style, and by the color of the dried fruit.

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[3] *This Journ.* **1** (1906), *Bot. Suppl.* 176.

15. S. palawanensis Brand, sp. nov.

Frutex cortice purpureo-brunneo, ramulis glabris, junioribus apice ferrugineis. Folia coriacea, 3–4.5 cm. longa, 1–[illegible] cm. lata, obovata vel oblongo-lanceolata, utrimque glaberrima, margine glandulosa, in [illegible] longiusculum subito producta, basi cuneata; costa supra impressa, [illegible] laterales inconspicui vel leviter prominuli; petiolus 4 mm. longus. Spicae axillares, simplices, sub-5-florae, ferrugineae, 15 mm. longae; calyx ferrugineo-tomentosus, lobis minimis tubo multo brevioribus; corolla calyce duplo (?) longior; stamina ca. 15 (ex 1 flore); ovarium glabrum. Fructus junior tomentosus cylindricus.

A shrub 2 meters high, very common on the summit of Mount Pulgar, PALAWAN, at an altitude of 1,300 meters above sea level, type specimen collected by *H. M. Curran*, February, 1906, Forestry Bureau no. 3870 (unripe fruit).

16. S. depauperata Merrill in Bur. Govt. Lab. Publ. 29, (1905), 45.

Frutex ramulis purpureis, adpresse pilosis, junioribus ferrugineo-hirsutis. Folia chartacea vel fere subcoriacea, 2–4 cm. longa, 13–18 mm. lata, obovata vel elliptica vel oblonga, serrulata, supra ad costam impressam saepius pilosula, subtus juniora dense pilosa, adulta tantum ad costam ciliata, in apicem nonnunquam subfalcatum sensim producta, basi cuneata. Spicae fulvo-villosae, 5–10-florae, petiolo brevissimo 3–6-plo longiores, sed folio breviores; bracteae lanceolato-acutae; calyx glaber, lobis rotundatis, parce sericeis, tubum subaequantibus; corolla alba, calyce plus duplo longior; stamina ca. 25, corolla longiora; stylus glaber; ovarium pilosum. Fructus niger, globosus, 4 mm. longus, exocarpio fragili crassiusculo, semina incurva.

LUZON, Province of Benguet, Baguio (5909, 6508 *Elmer*) June, 1904; (4333 *Merrill*) October, 1905; (10 *Topping*) February, 1903; (961 *Williams*) September, 1904; (*Dr. Pond*) March, 1904; Mount Tonglon (Santo Tomas), (*Mearns*) December, 1906: District of Lepanto, Mount Data (4526 *Merrill*) *November*, 1905.

A shrub 1.5 to 3.5 meters high, with smooth dark-brown bark and white flowers, fruit dark-purple. It occurs in the highlands of Benguet and Lepanto, Luzon, at altitudes of from 1,500 to 2,250 meters above the sea.

Var. **sordida** Brand, var. nov.

Differt a typo pubescentia sordida, foliis latioribus, 18–24 mm. latis, staminibus minus numerosis (ca. 20).

Type specimen from Mount Midiaas, PANAY, collected by *A. E. Yoder* in April, 1905.

Possibly a valid species, but the material at hand is rather imperfect.

CONTRIBUTIONS TO THE BRYOLOGICAL FLORA OF THE PHILIPPINES: II.[1]

By V. F. BROTHERUS.
(*Helsingfors, Finland.*)

SPHAGNACEÆ.

SPHAGNUM (Dill.) Ehrh.

Sphagnum Junghuhnianum Doz. et Molk.

LUZON, Province of Benguet, Suyoc to Pauai, in mossy forests on banks, alt. 2,060 m. (4920 *Merrill*); District of Lepanto, Mount Data, border of a small pond, alt. 2,120 m. (4919 *Merrill*).

Area: Sikkim, Khasia, Java, Batjan, Celebes, Philippines.

Sphagnum malaccense Warnst.

LUZON, Province of Benguet, Suyoc to Pauai, on banks, alt. 2,120 m. (4972 *Merrill*).

Area: Malacca.

Sphagnum luzonense Warnst.

LUZON, District of Lepanto, Mount Data, submerged border of small pond, alt. 2,120 m. (4911 *Merrill*).

Area: Philippines.

DICRANACEÆ.

TREMATODON Michx.

Trematodon acutus C. Müll.

LUZON, Province of Bataan, Lamao River, on rocks, alt. 485 m. (1405 *Copeland*); Mount Mariveles (6875 *Elmer*): Province of Cavite, Mendez Nunez (Bur. Sci. 1282 *Mangubat*).

Area: Java.

Trematodon paucifolius C. Müll.

LUZON, Province of Benguet, Bued River, on damp clay banks, alt. 1,060 m. (4966 *Merrill*).

Area: Java.

DITRICHUM Timm.

Ditrichum difficile (Dub.) Fleisch.

LUZON, Province of Tayabas, Mount Banajao, alt. 2,250 m. (*Loher*.)

Area: Java, Borneo, and New Caledonia.

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[1] The first part is published in *Öfversigt af Finska Vet. Soc. Förh.* 47 (1905), Helsingfors. The geographical distribution is not indicated for species mentioned in the present paper which are included in the first part.

15. **S. palawanensis** Brand, sp. nov.

Frutex cortice purpureo-brunneo, ramulis glabris, junioribus apice ferrugineis. Folia coriacea, 3–4.5 cm. longa, 1–2 cm. lata, obovata vel oblongo-lanceolata, utrimque glaberrima, margine glandulosa, in apicem longiusculum subito producta, basi cuneata; costa supra impressa, nervi laterales inconspicui vel leviter prominuli; petiolus 4 mm. longus. Spicae axillares, simplices, sub-5-florae, ferrugineae, 15 mm. longae; calyx ferrugineo-tomentosus, lobis minimis tubo multo brevioribus; corolla calyce duplo (?) longior; stamina ca. 15 (ex 1 flore); ovarium glabrum. *Fructus* junior tomentosus cylindricus.

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Type specimen from Mount Midinas, PANAY, collected by *A. E. Yoder* in April, 1905.

Possibly a valid species, but the material at hand is rather imperfect.

CONTRIBUTIONS TO THE BRYOLOGICAL FLORA OF THE PHILIPPINES: II.[1]

By V. F. Brotherus.
(*Helsingfors, Finland.*)

SPHAGNACEÆ.

SPHAGNUM (Dill.) Ehrh.

Sphagnum Junghuhnianum Doz. et Molk.

Luzon, Province of Benguet, Suyoc to Pauai, in mossy forests on banks, alt. 2,000 m. (4920 *Merrill*); District of Lepanto, Mount Data, border of a small pond, alt. 2,120 m. (4919 *Merrill*).

Area: Sikkim, Khasia, Java, Batjan, Celebes, Philippines.

Sphagnum malaccense Warnst.

Luzon, Province of Benguet, Suyoc to Pauai, on banks, alt. 2,120 m. (4972 *Merrill*).

Area: Malacca.

Sphagnum luzonense Warnst.

Luzon, District of Lepanto, Mount Data, submerged border of small pond, alt. 2,120 m. (4911 *Merrill*).

Area: Philippines.

DICRANACEÆ.

TREMATODON Michx.

Trematodon acutus C. Müll.

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Area: Java.

Trematodon paucifolius C. Müll.

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DITRICHUM Timm.

Ditrichum difficile (Dub.) Fleisch.

Luzon, Province of Tayabas, Mount Banajao, alt. 2,250 m. (*Loher.*)

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CERATODON Brid.

Ceratodon stenocarpus Bryol. Eur.

LUZON, Province of Benguet, Pauai to Baguio, on dry cliffs, alt. 1,760 m. (4917 *Merrill*).

Area: Widely distributed in the tropical and subtropical regions of the world.

HOLOMITRIUM Brid.

Holomitrium vaginatum Brid.

LUZON, Province of Bataan, Mount Mariveles (*Copeland*).

Area: South and East Africa, Java, Philippines, Tahiti.

DICRANOLOMA Ren.

Dicranoloma brevisetum (Doz. et Molk.) Par.

LUZON, Province of Benguet, Suyoc to Pauai, on trees, alt. 1,970 m. (4942 *Merrill*).

Area: Ceylon, Java, and New Caledonia.

Dicranoloma Braunii (C. Müll.) Par. f. **mindanense** Fleisch.

LUZON, Province of Laguna, Mount Maquiling (*Lohèr*).

Area: Java, Moluccas, Mindanao.

CAMPYLOPUS Brid.

Campylopus caudatus (C. Müll.) Mont.

LUZON, Province of Benguet, Pauai, in *Sphagnum* hummocks, alt. 2,060 m. (4978 *Merrill*). MINDANAO, Province of Misamis, Mount Malindang (For. Bur. 4789 *Mearns and Hutchinson*).

Area: Nilghiri, Java, Borneo, and Halmaheira.

PILOPOGON Brid.

Pilopogon Blumei (Doz. et Molk.) Broth.

LUZON, Province of Benguet (5750 *Elmer*); District of Lepanto, Mount Data, border of a small pond on dead trunks, alt. 2,120 m. (4954 *Merrill*). MINDANAO, Lake Lanao, Camp Keithley, alt. 800 m. (45 *Mrs. Clemens*).

LEUCOBRYACEÆ.

LEUCOBRYUM Hamp.

Leucobryum sanctum Hamp.

LUZON, Province of Laguna, Mount Maquiling (*Loher*): Province of Rizal (Bur. Sci. 1747 *Ramos*). NEGROS, Gimagaan River, on logs in forests, alt. 75 m. (1564 *Whitford*).

Leucobryum javense (Brid.) Mitt.

LUZON, District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4884 *Merrill*). MINDANAO, Province of Misamis, Mount Malindang (For. Bur. 4792 *Mearns and Hutchinson*). PALAWAN, Mount Pulgar, on rocks, alt. 1,300 m. (For. Bur. 3887 *Curran*).

OCTOBLEPHARUM Hedw.

Octoblepharum albidum (L.) Hedw.

LUZON, Province of Tayabas, Laguimanoc, on palm trunks, near sea level (4022 *Merrill*).

ARTHROCORMUS Doz. et Molk.

Arthrocormus Schimperi Doz. et Molk.

NEGROS, Gimagaan River (1487 ex p. *Whitford*).

Area: Java, Amboina, Borneo, Mindanao.

SCHISTOMITRIUM Doz. et Molk.

Schistomitrium Copelandii Broth. n. sp.

Dioicum; sat gracile, caespitosum, caespitibus densis, mollibus, albescenti-viridibus, vix nitidiusculis; *caulis* vix ultra 1 cm. altus, erectus, basi fusco-radiculosus, dense foliosus, furcatus vel simplex; *folia* erecto-patentia, stricta, e basi concava, ovata vel oblonga sensim lanceolato-angustata, fusco-mucronata, 3 mm. vel paulum ultra longa et circ. 0.75 mm. lata, marginibus erectis, superne conniventibus, integerrimis, limbo inferne 4–5 seriato, superne sensim angustiore. Caetera ut in *S. apiculato*.

MINDANAO, District of Zamboanga, on branches, alt. 1,270 m. (*E. B. Copeland*).

Species *Sch. apiculato* Doz. et Molk. proxima, sed mollitie, statura paulum robustiore foliisque erecto-patentibus dignoscenda.

LEUCOPHANES Brid.

Leucophanes candidum (Hornsch.) Lindb.

MINDANAO, Lake Lanao, Camp Keithley, on trees (4 Mrs. *Clemens*). PALAWAN, on trees (Bur. Sci. 759 *Foxworthy*).

Area: Ceylon, Malacca, Sumatra, Java, Amboina, Banka, Borneo, Celebes, New Guinea, and Samoa.

FISSIDENTACEÆ.

FISSIDENS Hedw.

Fissidens anomalus Mont.

LUZON, Province of Benguet, Pauai, on mossy trees in forests, alt. 2,060 m. (4957 *Merrill*).

Area: Sikkim, Khasia, Nilghiri, Ceylon, and Java.

Fissidens nobilis Griff.

LUZON, District of Lepanto, Mount Data, on wet rocks and banks, alt. 2,120 m. (4995 Merrill): Province of Rizal, Bosoboso (Bur. Sci. 991 *Ramos*).

Area: Nepal, Sikkim, Khasia, Ceylon, Sumatra, Java, and Hongkong.

Fissidens areolatus Griff.

LUZON, District of Lepanto, Mount Data, on earth in mossy forests, alt. 2,120 m. (4943 *Merrill*).

Area: Sikkim, Khasia, and Awa.

CALYMPERACEÆ.

SYRRHOPODON Schwaegr.

Syrrhopodon albo-vaginatus Schwaegr.

NEGROS, Gimagaan River, on fallen trees in forests, alt. 75 m. (1563 ex p. *Whitford*).

Area: Moluccas and Pacific islands.

Syrrhopodon Wallisii C. Müll.

NEGROS, Gimagaan River, on limbs of large trees (1572 *Whitford*).

CALYMPERES Sw.

Calymperes tenerum C. Müll.

LUMBACAN, on trees over beach, sea level (*5279 Merrill*).
Area: India.

POTTIACEÆ.

BARBULA Hedw.

Barbula orientalis (Willd.) Broth.

BALAÑAC, on earth, near sea level (Bur. Sci. 528 *Mangubat*).

HYOPHILA Brid.

Hyophila flavipes Broth. *sp. nov.*

Dioica; gracilis, caespitosa, caespitibus humilibus, laxiusculis, rigidiusculis, laete viridibus; *caulis* vix ultra 3 mm. altus, erectus, strictus, basi fusco-radiculosus, dense foliosus, simplex; *folia* sicca incurva, marginibus involutis, humida patentia, caviuscula, carinata, inferiora minora, superiora e basi brevi angustiore oblonga, obtusa, apiculata, circ. 3 mm. longa et circ. 1 mm. lata, marginibus ubique erectis, apice denticulatis, nervo crasso, rufescente vel lutescente, in summum apicem folii evanido, cellulis minutissimis, rotundatis, chlorophyllosis, sublaevibus, basilaribus multo majoribus, rectangularibus, pellucidis, laevissimis; *bracteae perichaetii* intimae breviores, arcte vaginantes, obtusissimae, integrae, nervo longe infra apicem evanido, cellulis oblongis, basin versus sensim longioribus; *seta* 10–13 mm. alta, tenuissima, strictiuscula, flavida; *theca* erecta, anguste cylindricea, symmetrica, circ. 1.7 mm. longa et circ. 0.38 mm. crassa, fusca; *annulus* circ. 0.05 mm. latus; *peristomium* nullum; *operculum* minutum longe et tenuissime rostratum.

BALUT Island, on rocks in shaded damp ravines, alt. 150 m. (*5425 Merrill*).

Species *H. stenocarpae* Ren. et Card. affinis, sed caule brevi, foliis duplo latioribus setaque flavida dignoscenda.

TIMMIELLA (DeNot.) Limpr.

Timmiella Merrillii Broth. sp. nov.

Dioica; robustiuscula, caespitosa, caespitibus laxis, humilibus, lutescenti-viridibus, haud nitidis; *caulis* erectus vix ultra 5 mm. altus, basi radiculosus, dense foliosus, simplex; *folia* comalia sicca circinato-incurva, humida erecto-patentia, canaliculato-concava, e basi brevi erecta angustiore lanceolato-linearia, breviter acuminata, acuta, usque ad 5 mm. longa et circ. 0.75 mm. lata, lamina bistratosa, marginibus incurvis, superne denticulatis, nervo basi circ. 0.17 mm. lato, superne sensim angustiore, infra summum apicem folii evanido, dorso laevi et siccitate nitidiusculo, cellulis laminalibus dorsalibus rotundato-quadratis, 0.010–0.012 mm. chlorophyllosis, ventralibus majoribus, alte mamillose prominentibus, hyalinis, basilaribus multo majoribus, oblongo-hexagonis vel rectangularibus, teneris, hyalinis; *bracteae perichaetii* foliis similes; *seta* usque ad 3 cm.

alta, erecta, tenuis, flexuosula, rubella; *theca* suberecta, anguste cylindrica, paulum asymmetrica, circ. 3 mm. alta et circ. 0.6 mm. crassa, sicca curvula, striatula, nitidiuscula, fusca; *annulus* latus, revolubilis; *tubus basilaris* exostomii circ. 0.05 mm. altus; *exostomii* dentes circ. 0.57 mm. longi, filiformes, parum contorti, dense papillosi, pallide rubri; *spori* 0.012–0.015 mm. lutescenti-virides, laeves; *operculum* conico-subulatum, circ. 1.3 mm. altum, cellulis in seriebus obliquis dispositis.

LUZON, Province of Benguet, Baguio, wet banks in ravines, alt. 1,360 m. (4897 *Merrill*); Bued River, damp bank in shaded ravine, alt. 1,212 m. (4890 *Merrill*).

ORTHOTRICHACEÆ.

ANOECTANGIUM (Hedw.) Bryol. Eur.

Anoectangium subclarum Broth. sp. nov.

Dioicum; gracile, caespitosum, caespitibus compactis, usque ad 2 cm. altis, inferne tomentosis, ferrugineis, superne laete vel lutescenti-viridibus, haud nitidis; *caulis* erectus, dense foliosus, furcatus vel simplex; *folia* sicca flexuosulo-adpressa, apicalia plus minusve distincte spiraliter contorta, humida erecto-patentia, carinato-concava, lineari-lanceolata, acuta, circ. 1.4 mm. longa et circ. 0.3 mm. lata, marginibus erectis, integerrimis, nervo crassiusculo, lutescente, infra summum apicem folii evanido, dorso ubique scabro, cellulis subrotundis, minutis, incrassatis, papillosis, pellucidis, basilaribus infimis ad nervum rectangularibus; *seta* lateralis, circ. 1 cm. longa, tenuissima, flexuosula, flavida; *theca* erecta, ovalis, leptodermis, nitidiuscula, fusca; *operculum* planiusculum, rostratum, rostro tenuissimo obliquo, capsulam longitudine fere aequante.

LUZON, Province of Benguet, Bugias, on cliffs (4901 *Merrill*).

Species *A. claro* Mitt. affinis, sed statura robustiore jam dignoscenda.

MACROMITRIUM Brid.

Macromitrium Reinwardtii Schwaegr.

LUZON, Province of Benguet, Pauai, on shrubs, alt. 2,060 m. (4910 *Merrill*).

Macromitrium (Goniostoma) mindanaense Broth. sp. nov.

Dioicum; sat gracile, rigidiusculum, lutescenti-fuscescens, haud nitidum; *caulis* repens, usque ad 10 cm. longus, per totam longitudinem hic illic fusco-radiculosus vel tomentosus, plus minusve ramosus, ramis usque ad 4 cm. longis, erectis, flexuosis, dense foliosis, breviter et vage ramulosis; *folia ramea* sicca adpressa, apice flexuoso, humida subsquarrosa, carinato-concava, ovato-lanceolata, sensim subulato-acuminata, apice hyalina, circ. 2.2 mm. longa, et circ. 0.45 mm. lata, marginibus erectis, apice denticulatis, nervo rufescente, laevi, in aristam brevem tenuem apice hyalinam excedente, cellulis superioribus rotundato-quadratis, circ. 0.010 mm., sublaevibus, chlorophyllosis, basin versus sensim majoribus, subrhombeis, grosse papillosis, basilaribus ad nervum elongatis, valde incrassatis, lumine lineari, basilaribus externis elongatis, valde incrassatis, lumine lineari, limbum latum laevem efformantibus; *bracteae perichaetii* erectae, foliis longiores, longius acuminatae, longe aristatae; *seta* circ. 5 mm. alta, strictiuscula, sicca dextrorsum torta, rubra, ubique scabra; *theca* erecta, ovalis, fuscidula, ore intensius colorata, sicca laevis, ore plicata; *peristomium* simplex, e membrana circ. 0.075 mm. alta hyalina valde papillosa compositum; *calyptra* campanulata, plicata, pilis elongatis suberectis fusco-aureis dense vestita. Caetera ignota.

MINDANAO, Province of Misamis, Mount Malindang, on trees (For. Bur. 4794 *Mearns and Hutchinson*).

Species curiosissima, pulcherrima, cum nulla specie adhuc cognita sectionis *Goniostomae* commutanda.

Macomitrium (Leiostoma) Copelandii Broth. sp. nov.

Dioicum: sat gracile, caespitosum, caespitibus densis, mollibus, fuscescenti-viridibus, aetate fuscescentibus, haud nitidis; *caulis* repens, fusco-tomentosus, densissime ramosus, ramis erectis, circ. 1.5 cm. longis, flexuosulis, inferne fusco-radiculosis, densissime foliosis, breviter et vage ramulosis, obtusis; *folia ramea* sicca flexuosulo-adpressa, comalia tantum indistincte spiraliter contortula, humida patula carinato-concava, ovato-ligulata, obtusa, mucronata, apicalia aristata, circ. 1.15 mm. longa, marginibus erectis, integerrimis, nervo crassiusculo, rufescente, in mucronem vel aristam laevem excedente, cellulis superioribus subrotundis 0.010–0.012 mm. pellucidis, laevibus, dein majoribus, basilaribus elongatis, incrassatis, lumine angustissimo, ad plicas elevato-papillosis; *bracteae perichaetii* foliis subsimiles; *seta* 1 cm. alta, tenuissima, sicca flexuosula, lutescens, laevissima; *theca* erecta, minuta, ovalis, circ. 1.2 mm. alta, leptodermis, sicca laevis, ore haud plicata, fuscidula; *calyptra* nuda. Caetera ignota.

LUZON, Province of Bataan, Mount Mariveles, on trees (*Copeland*).

Species *M. Blumei* Nees affinis, sed foliis comalibus tantum indistincte spiraliter contortis necnon seta ubique scabra jam dignoscenda.

Macromitrium (Leiostoma) Foxworthyi Broth. sp. nov.

Dioicum; gracile, caespitosum, caespitibus densis, humilibus, pallide viridibus, aetate fuscescenti-viridibus, haud nitidis; *caulis* elongatus, repens, plus minusve fusco-tomentosus, dense ramosus, ramis erectis, vix ultra 7 mm. altis, dense foliosis, simplicibus vel apice divisis, obtusis; *folia ramea* sicca circinato-incurva, humida patula, lineari-lanceolata, acuta, circ. 1.9 mm. longa et circ. 0.3 mm. lata, marginibus erectis, integerrimis, nervo lutescente, infra summum apicem folii evanido, cellulis subrotundis, 0.005–0.007 mm., pellucidis, sublaevibus, basilaribus elongatis, incrassatis, lumine semilunari, laevissimis; *bracteae perichaetii* erectae, foliis subsimiles, angustius acuminatae; *seta* 4 mm. alta, tenuis, strictiuscula, rubella, laevissima; *theca* erecta, ovalis, circ. 1.7 mm. longa et circ. 0.9 mm. crassa, microstoma, laevis; *peristomium* nullum; *spori* 0.016–0.024 mm., virides, papillosi; *operculum* e basi conica longe et tenuiter rostratum; *calyptra* campanulata, plicata, thecam obtegens, fuscescens, ubique densiuscule pilosa, pilis erectis, strictis. Planta mascula ignota.

LUZON, Province of Pampanga, Mount Abu (Bur. Sci. 1932 *Foxworthy*).

Species ob peristomium deficiens cum *M. elongato* Doz. et Molk. comparanda, sed notis caeteris diversissima.

Macromitrium cuspidatum Hamp.

LUZON, Province of Rizal, Montalban (*Loher*). PALAWAN, Mount Pulgar, on rocks, alt. 1,300 m. (For. Bur. 3886 *Curran*).

Macromitrium sulcatum (Hook. et Grev.) Brid.

LUZON, Province of Benguet, Pauai to Baguio, on dry boulders, alt. 1,820 m. (4933 Merrill): District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4984 *Merrill*).

Area: India, Ceylon, Malacca, and Borneo.

Macromitrium goniorhynchum (Doz. et Molk.) Mitt.

LUZON, Province of Rizal, Bosoboso (Bur. Sci. 988 *Ramos*): Province of Zambales, Mount Pinatubo (*Loher*): Province of Bulacan, near Norzagaray (56 *Yoder*).

Area: Java and New Guinea.

SCHLOTHEIMIA Brid.

Schlotheimia speciosissima Broth. sp. nov.

Dioica: robusta, rufescens, nitidiuscula; *caulis* erectus, usque ad 10 cm., parce fusco-radiculosus, dense foliosus, inferne subsimplex, superne fasciculatim ramosus, ramis suberectis, flexuosulis, usque ad 4 cm. altis, fasciculatim ramulosis, obtusis; *folia* sicca densiuscule imbricata, haud vel vix spiraliter contorta, humida patentia, carinato-concava, late ligulata, obtusa, pilifera, laevia, sine pilo circ. 3 mm. longa et usque ad 1 mm. lata, marginibus e basi ad medium folii vel paulum ultra angustissime recurvis, integris, infima basi tantum ob cellulas marginales papillose exstantes serrulatis, nervo tenui, laevi, in pilum tenuem elongatum flexuosum laevem rufescentem apice hyalinum excedente, cellulis rhombeis, incrassatis, laevibus, basilaribus elongatis, grosse papillose exstantibus, infimis fusco-aureis; *bracteae perichaetii* erectae, intimae usque ad 5 mm. longae, sensim acuminatae, apice eroso-denticulatae, longissime piliferae, cellulis elongatis, minutius papillosis; *seta* circ. 1 cm. alta, strictiuscula, tenuis, rubra, laevissima; *calyptra* fusca, apice scaberula. Caetera ignota.

MINDANAO, Province of Misamis, Mount Malindang (For. Bur. 4798 *Mearns and Hutchinson*).

Species pulcherrima, *S. Wallisii* C. Müll. affinis, sed calyptra scaberula, nec dentibus robustis scabra jam dignoscenda.

FUNARIACEÆ.

FUNARIA Schreb.

Funaria (Entosthodon) luzonensis Broth. sp. nov.

Autoica; gracilis, caespitosa, caespitibus humilibus, laxis, viridibus, haud nitidis; *caulis* erectus, vix ultra 2–3 mm. altus, infima basi fusco-radiculosus, dein nudus, apice dense foliosus, simplex; *folia comalia* pauca, erecto-patentia, subcarinato-concava, e basi breviter spathulata ovalia, subito subulato-acuminata, subula excepta 1.7–2 mm. longa et 0.76–1 mm. lata, marginalibus erectis, superne minutissime serrulatis, nervo tenui longe infra apicem folii evanido, cellulis laxe oblongo- vel ovali-hexagonis, basilaribus elongate rectangularibus, marginalibus angustis, limbum uniseriatum efformantibus; *seta* 7–13 mm., tenuissima, flexuosula, lutescens, aetate lutescenti-rubra; *theca* erecta vel suberecta, e collo sporangii longitudinis vel longiore ovalis, sicca deoperculata sub ore paulum constricta, fusca, cellulis exothecii elongate hexagono-oblongis, leptodermibus, infra orificium in serie subunica hexagono-quadratis, ad orificium in seriebus nonnullis transverse anguste rectangularibus; *peristomium* simplex; *exostomii* dentes infra orificium oriundi, lanceolati, supra orificium circ. 0.2 mm. longi et circ. 0.05 mm. lati, obliquiusculi, rufescentes, longitudinaliter et oblique striolati, papillosi; *spori* 0.035–0.040 mm., fusci, papillosi; *operculum* planiusculum, circ. 0.35 mm. latum, cellulis in seriebus obliquis dispositis, luteum. Calyptra ignota.

LUZON, District of Lepanto, Mount Data, on bare steep slopes in thin pine forests at 1,970 m. alt. (4920 *Merrill*); Province of Benguet, Mount Tonglon, on damp banks, alt. ± 1,700 m. (4894 *Merrill*).

Species *F. attenuatae* (Dicks.) Lindb. affinis, sed notis supra allatis longe diversa.

Funaria calvescens Schwaegr.

LUZON, Province of Benguet, Bued River, on damp clay banks, alt. 1,212 m. (4891 *Merrill*).

BRYACEÆ.

BRACHYMENIUM Schwaegr.

Brachymenium nepalense Hook.

LUZON, Province of Benguet, Bugias, on trees (4967 *Merrill*); Baguio (For. Bur. 5103 *Curran*); Mount Tonglon, on dry boulders, alt. 1,700 m. (4967 *Merrill*): District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4932 *Merrill*): Province of Zambales, Mount Pinatubo (*Loher*).

POHLIA Hedw.

Pohlia Hampeana (Lac.) Broth.

LUZON, District of Lepanto, Mount Data, on earth, alt. 2,120 m. (4916 *Merrill*). Area: Ceylon, Java, and Celebes.

BRYUM Dill.

Bryum coronatum Schw.

Luzon, Province of Nueva Ecija, San Isidro, on damp stone walls of an old house (4197 *Merrill*). Palawan, Puerto Princesa (Bur. Sci. 243 *Bermejos*).

Bryum ambiguum Dub.

Mindanao, Lake Lanao, Camp Keithley, on earth, alt. 800 m. (*Mrs. Clemens*).

Bryum (Erythrocarpa) chrysobasilare Broth. sp. nov.

Dioicum; sat gracile, caespitosum, caespitibus densis, fuscescenti-viridibus, nitidiusculis; *caulis* erectus, 7 mm. altus vel paulum ultra, inferne fusco-tomentosus, superne dense foliosus, innovationibus brevibus erectis inferne laxe, apice dense foliosis; *folia comalia* sicca laxe imbricata, humida suberecta, haud decurrentia, concaviuscula, ovato- vel oblongo-lanceolata, breviter acuminata, nervo excedente, aristata, marginibus fere ad apicem recurvis, superne denticulatis, limbata, nervo crassiusculo, rufescente, in aristam longiusculam strictam denticulatam excedente, cellulis rhomboideis, paulum incrassatis, basilaribus abbreviatis, laxis, pulchre fusco-aureis, marginalibus angustissimis, limbum lutescentem angustum efformantibus; *bracteae perichaetii* minores et angustiores, angustius acuminatae; *seta* 2-3 cm. alta, tenuis, sicca flexuosula, pallide rubra, nitidiuscula; *theca* horizontalis vel nutans, paulum asymmetrica vel subregularis, e collo longiusculo elongato-oblonga vel subcylindrica, cum collo usque ad 5 mm. longa, pachydermis, fusca, aetate atrofusca sicca sub ore vix vel paulum constricta; *annulus* latus revolubilis; *exostomii* dentes lineari-lanceolati, breviter subulato-acuminati, circ. 0.5 mm. longi, rufescentes, apice hyalini et papillosi, late limbati, lamellis 15–20; *endostomium* liberum, sordide luteum, papillosum; *corona basilaris* ad dimidiam partem dentium producta; *processus* lanceolati, late perforati; *cilia* bina, bene evoluta, appendiculata; *spori* 0.010-0.012 mm. ferruginei, laeves; *operculum* conicum, apiculatum, nitidiusculum.

Luzon, District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4956 *Merrill*).

Species habitu *B. erythrocarpo* Schwaegr. sat similis, sed foliis limbatis, cellulis basilaribus fusco-aureis dignoscenda.

Bryum argenteum Linn.

Luzon, District of Lepanto, Balili, banks of streams on rocks, alt. 1,670 m. (4950 *Merrill*).

Area: Widely distributed in all parts of the world.

Bryum (Argyrobryum) erectum Broth. sp. nov.

Dioicum; gracile, caespitosum, caespitibus densiusculis, mollibus, niveis, nitidiusculis; *caulis* erectus, vix ultra 1 cm. altus, inferne fusco-radiculosus, dense foliosus, in axillis foliorum corpuscula microphyllina gerens, ramosus, ramis erectis, teretibus, brevibus, obtusis; *folia* imbricata, haud decurrentia, concaviuscula, ovata vel ovalia, breviter lanceolato-acuminata, acuta, marginibus erectis, integerrimis, haud limbata, nervo tenui, basi rubello, supra medium folii evanido, cellulis superioribus elongate hexagono-rhomboideis, inanibus, inferioribus chlorophyllosis, basilaribus rectangularibus, alaribus quadratis; *bracteae perichaetii* foliis majores, ovato-lanceolatae; *seta* 1.5 cm. alta, tenuis, sicca flexuosula, dextrorsum torta, rubra; *theca* erecta, oblonga, regularis, brevicollis, sicca deoperculata, laevis, vix sub ore contracta, fusco-rubra, cellulis exothecii irregularibus, pachydermibus, ad orificium in seriebus 5–6 multo minoribus, rotundato-polygonis, minus incrassatis; *annulus* latus, revolubilis; *exostomii* dentes lanceolato-subulati, circ. 0.35 mm. alti, basi circ. 0.04 mm. lati, fusco-lutei, minutissime papillosi, apice hyalini, distinctius papillosi, dense lamellati; *endostomium* sordide luteum, minutissime papillosum; *corona basilaris* alta; *processus* carinati, rimosi; *cilia* terna, bene evoluta, nodosa, haud appendiculata; *spori* 0.010–0.012 mm., lutei, laeves; *operculum* obtuse conicum.

LUZON, Province of Benguet, Kabayan, on damp and dry boulders (4968 *Merrill*).

Species *B. microthecae* C. Müll. affinis, sed theca erecta jam dignoscenda.

MNIACEÆ.

ORTHOMNIUM Wils.

Orthomnium stolonaceum Broth. sp. nov.

Robustum, late caespitosum, stolonibus elongatis, repentibus, per totam longitudinem fusco-radiculosis, laxiuscule foliosis; *folia* sicca vix contracta, humida patula, planiuscula, haud decurrentia, e basi brevissima, anguste ovalia, obtusissima vel emarginata, usque ad 6 mm. longa et circ. 3 mm. lata, marginibus erectis, integris, limbata, limbo lutescente, angustissimo, ex unica serie cellularum elongatarum formato, nervo basi lato, superne multo angustiore, infra summum apicem folii evanido, cellulis rotundato- vel ovali-hexagonis, 0.05–0.09 mm. longis et circ. 0.05 mm. latis, infima basi tantum elongate rectangularibus, omnibus plus minusve chlorophyllosis, laevissimis. Caetera ignota.

MINDANAO, Lake Lanao, Camp Keithley, alt. 800 m. (Mrs. *Clemens*).

Species valde peculiaris, habitu *Eum*
structuram ad *Orthomnium* pertinens.

RHIZOGONIACEÆ.

RHIZOGONIUM Brid.

Rhizogonium spiniforme (L.) Bruch.

LUZON, Province of Rizal, Montalban (*Loher*), (Bur. Sci. 1766 *Ramos*): Province of Benguet, Pauai, on mossy trees, alt. 2,000 m. (4885 *Merrill*).

Rhizogonium longiflorum (Mitt.) Jaeg.

NEGROS, Gimagaan River (1487 *Whitford*).

Area: Labuan.

BARTRAMIACEÆ.

BREUTELIA Schimp.

Breutelia (Acoleos) Merrillii Broth. sp. nov.

Dioica; gracilis, caespitosa, caespitibus laxiusculis, mollissimis, stramineis, nitidis; *caulis* erectus, usque ad 1 cm. altus, inferne ferrugineo-radiculosus, laxiuscule foliosus, apice innovationibus paucis, brevibus, vix ultra 5 mm. longis, curvatulis, densius foliosis, obtusis; *folia* erecto-patentia, carinato-concava e basi ovato-lanceolata subulata, piliformi-acuminata, circ. 3 mm. vel paulum ultra longa, basi circ. 0.45 mm. lata, marginibus longe ultra medium anguste revolutis, superne denticulatis, nervo tenui, piliformiter excedente, dorso denticulato, cellulis linearibus, apice papilla praeditis, infimis fusco-aureis, alaribus paucis quadratis; *seta* circ. 15 mm. alta, tenuis, flexuosula, rubra; *theca* inclinata, minuta, breviter oblonga, substrumosa, sicca plicata, fuscidula; *operculum* depresse conicum, mamillatum.

Luzon, District of Lepanto, Mount Data, on damp banks in open pine forests, alt. 2,000 m. (4873 *Merrill*).

Species *B. Sieberi* (Hornsch.) Mitt. forsan affinis, sed notis supra allatis facillime dignoscenda.

Breutelia arundinifolia (Dub.) Broth.

Luzon, Province of Benguet, Mount Tonglon, base of cliffs, alt. 2,120 m. (4903 *Merrill*).

Area: Sumatra, Java, Celebes, Philippines.

PHILONOTIS Brid.

Philonotis secunda (Doz. et Molk.) Bryol. Jav.

Luzon, Province of Rizal, Bosoboso (Bur. Sci. 1170 *Ramos*).

Area: Java.

BARTRAMIDULA Bryol. Eur.

Bartramidula Roylei (Hook. f.) Bryol. Eur.

Luzon, Province of Benguet, Bued River, shaded banks, alt. 1,212 m. (4899 *Merrill*).

Area: Himalaya, Bhotan, Nilghiri, and Ceylon.

POLYTRICHACEÆ.

CATHARINAEA Ehrh.

Catharinaea flaviseta (Mitt.) Broth.

Luzon, Province of Benguet, Daklan to Kabayan, on banks, alt. 1,212 m. (4947 *Merrill*).

Area: Himalaya and Japan.

RHACELOPUS Doz. et Molk.

Rhacelopus pilifer Doz. et Molk.

Luzon, Province of Tayabas, Atimonan, on damp banks in forests, alt. 212 m. (3993 *Merrill*).

Area: Malacca, Siam, Tonkin, Java, Batjan, Borneo, and New Guinea.

POGONATUM P. Beauv.

Pogonatum spinulosum Mitt.

LUZON, District of Lepanto, Mount Data, on steep slopes, in open pine forests, alt. 1,970 m. (4973 *Merrill*).

Area: Japan and China.

Pogonatum nudiusculum Mitt.

LUZON, Province of Benguet, Baguio, on rocks in damp ravines, alt. 1,360 m. (4937 *Merrill*).

Area: Sikkim and Bhotan.

Pogonatum albo-marginatum (C. Müll.) Jaeg.

LUZON, Province of Pampanga, Mount Abu, on wet rocks, alt., 1,800 m. (Bur. Sci. 1987 *Foxworthy*). MINDANAO, Lake Lanao, Camp Keithley, alt. 800 m. (945 Mrs. *Clemens*).

Pogonatum Junghuhnianum (Doz. et Molk.) Bryol. Jav.

LUZON, Province of Benguet, Baguio, on damp clay banks, alt. 1,300 m. (4992 *Merrill*).

Area: Java.

Pogonatum macrophyllum Bryol. Jav.

MINDANAO, District of Zamboanga, in forests, alt. 1,270 m. (*Copeland*).

Area: Sumatra, Java, and Batjan.

Pogonatum cirratum (Sw.) Brid.

LUZON, District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4908 *Merrill*).

Area: Java, Borneo, Celebes, China, New Guinea.

Pogonatum microstomum (R. Br.) Brid.

LUZON, District of Lepanto, Mount Data, border of a small lake on upturned stump, alt. 2,120 m. (4991 *Merrill*).

Area: Himalaya, Khasia, Nilghiri, Ceylon, and Yunnan.

DAWSONIACEÆ.

DAWSONIA R. Br.

Dawsonia superba R. Br.

MINDANAO, Province of Misamis, Mount Malindang (For. Bur. 4788 *Mearns and Hutchinson.*)

Area: East Australia, Tasmania, and New Zealand.

SPIRIDENTACEÆ.

SPIRIDENS Nees.

Spiridens Reinwardtii Nees.

MINDANAO, Province of Misamis, Mount Malindang (For. Bur. 4797 *Mearns and Hutchinson*).

Spiridens longifolius Lindb.

LUZON, District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4865 *Merrill*): Province of Rizal, Oriud (*Loher*).

Area: Philippines.

LEUCODONTACEÆ.

OEDICLADIUM Mitt.

Oedicladium (Pseudo-Dicranum) Foxworthyi Broth. sp. nov.

Dioicum; sat robustum, caespitosum, caespitibus densis, rigidis, lutescenti- vel fuscescenti-viridibus, sericeo-nitidis; *caulis* erectus, 4–6 cm. altus, basi radiculosus, dense foliosus, plerumque plus minusve ramosus; *folia* scariosa, subaequalia, erecto-patentia, sicca erectiora, haud homomalla, caniculato-concava, anguste ovato-lanceolata, sensim longissime filiformi-acuminata, marginibus superne subconniventibus, integerrimis vel summo apice minutissime et remote denticulatis, enervia vel brevissime binervia, cellulis anguste linearibus, haud incrassatis, inter se porosis, laevissimis, basilaribus infimis abbreviatis, incrassatis, inter se valde porosis, fusco-rubris, alaribus vix diversis; *bracteae perichaetii* foliis multo breviores, e basi vaginante, late ovato-lanceolata raptim anguste subulato-acuminatae, superne minutissime denticulatae, basi fusco-aureae; *seta* 1.5 cm. alta, tenuis, flexuosula, rubra, laevissima; *theca* erecta, minuta, ovalis, circ. 1.5 mm. longa et circ. 0.8 mm. crassa, brevicollis, leptodermis, fuscidula, laevis, cellulis exothecii ovali-hexagonis, haud incrassatis, ad orificium multo minoribus, rotundato-hexagonis, in seriebus pluribus dispositis; *annulus* nullus; *exostomii* dentes ad orificium thecae orinudi, basi connati, anguste lanceolato-subulati, circ. 0.2 mm. longi et circ. 0.04 mm. lati, hyalini, laevissimi; *spori* 0.015–0.020 mm., olivacei, minutissime papillosi; operculum luteum e basi minuto conico oblique rostratum, rostro angusto, circ. 0.9 mm. alto; calyptra cucullata, fere ad basin thecae descendens, straminea, apice fuscidula, laevis. *Planta mascula* ignota.

LUZON, Province of Laguna, Mount Banajao, on trees, alt. 1,850 to 2,000 m. (Bur. Sci. 2429, 2436 *Foxworthy*).

Species pulcherrima, foliorum forma ab omnibus speciebus generis adhuc cognitis diversissima, sectionem propriam constituens.

NECKERACEÆ.

ENDOTRICHELLA C. Müll.

Endotrichella elegans (Doz. et Molk.) Fleisch.

MINDANAO, district of Zamboanga, on trees, alt. 1,270 m. (*Copeland*). NEGROS, (For. Bur. 5564 *Everett*).

Endotrichella serricuspes Broth. sp. nov.

Species *E. Wallisii* C. Müll. et *E. eleganti* (Doz. et Molk.) Fleisch. habitu simillima, sed foliis longius et robustius subulato-cuspidatis, cuspide inaequaliter sublaciniato-serrato, serraturis majoribus, margine serrulatis dignoscenda.

MINDANAO, Province of Misamis, Mount Malindang, on trees (For. Bur. 4793 *Mearns and Hutchinson*.)

PTEROBRYELLA C. Müll.

Pterobryella longifrons (C. Müll.) C. Müll.

LUZON, Province of Laguna, Mount Banajao (*Loher*); (Bur. Sci. 2426 *Foxworthy*). MINDANAO, Province of Misamis, Mount Malindang, (For. Bur. 4790 *Mearns and Hutchinson*).

Area: Philippines.

TRACHYPUS Reinw. et Hornsch.

Trachypus subbicolor (C. Müll.)

LUZON, District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4002, 4071 *Merrill*): Province of Benguet, Pauai, on mossy trees, alt. 2,000 m. (4955 *Merrill*).

Area: Sikkim.

NECKERA Hedw.

Neckera Lepineana Mont.

LUZON, Province of Tayabas, Mount Banajao, alt. 800 m. (7412 ex p. *Elmer*). MINDANAO, Lake Lanao, Camp Keithley, alt. 760 m. (527 Mrs. *Clemens*).

Area: Sumatra, Java, Philippines, and Pacific islands.

ENTODONTACEÆ.

ENTODON C. Müll.

Entodon longidens Broth.

MINDANAO, Lake Lanao, Camp Keithley (Mrs. *Clemens*).

Entodon Bandongiae (C. Müll.) Jaeg.

LUZON, Province of Pampanga, Mount Arayat, on dry boulders in forests, alt. 400 m. (5028 *Merrill*).

Area: Sumatra, Java, and Celebes.

CAMPYLODONTIUM Schwaegr.

Campylodontium flavescens (Hook.) Bryol. Jav.

LUZON, Province of Rizal, Bosoboso (Bur. Sci. 988 ex p. *Ramos*).

Area: India, Assam, Burma, Malacca, Sumatra, Java, and Celebes.

ERYTHRODONTIUM Hampe.

Erythrodontium squarrulosum (Mont.) C. Müll.

LUZON, Province of Benguet, Kabayan, on wet rocks on banks (4875 *Merrill*); Baguio (For. Bur. 5128 *Curran*).

STEREOPHYLLUM Mitt.

Stereophyllum anceps (Bryol. Jav.) Broth.

LUZON, Province of Rizal (Bur. Sci. 17 *Foxworthy*); Bosoboso (Bur. Sci. 1175 *Ramos*).

FABRONIACEÆ.

FABRONIA Raddi.

Fabronia curvirostris Doz. et Molk.

LUZON, Province of Benguet, Bugias (4927 *Merrill*)

Area: Java.

MERRILLIOBRYUM Broth. gen. nov.

Merrilliobryum fabronioides Broth. gen. nov. et sp. nov.

Autoicum; tenellum, caespitosum, caespitibus densis, caulibus valde intertextis, mollissimis, albescenti-viridibus, sericeo-nitidis; *caulis* repens, tenuissimus, per totam longitudinem fusco-tomentosus, pinnatim ramosus, ramis suberectis, 3–5 mm. longis, curvatulis, dense foliosis, haud attenuatis, simplicibus; *folia* erecto-patentia, breviter decurrentia, e basi truncata ovato-lanceolata, sensim in pilum longissimum, flexuosulum attenuata, marginibus erectis, minutissime denticulatis, nervo tenui, vix ultra medium folii producta, saepe obsoleto, cellulis laxe lineari-hexagonis, leptodermibus, hyalinis, laevissimis, basilaribus laxis, abbreviatis, alaribus quadratis; *bracteae perichaetii* erectae, intimae e basi oblonga raptim piliformi-acuminatae, ad basin subulae dentibus singulis majusculis praeditae, enerves; *seta* circ. 1.5 cm. alta, tenuis, flexuosula, rubra, laevissima; *theca* erecta, pro planta majuscula, ovalis, regularis, circ. 2.5 mm. longa et circ. 1.2 mm. crassa, brevicollis, leptodermis, fuscidula, aetate nigrescens, sicca laevis, nitidiuscula, cellulis exothecii ovali- vel subrotundo-polygonis, parietibus crassiusculis, orificium versus sensim minoribus; *annulus* nullus; *peristomium* duplex; *exostomii* dentes prope orificium thecae oriundi, sicci et humidi erecti, dolabriformes, circ. 0.4 mm. longi et circ. 0.075 mm. lati, basi rufescentes, linea media flexuosa notati, dense transverse striolati, dense articulati, haud lamellati; *endostomium* liberum, sordide fusco-luteum, laeve; *corona basilaris* ad dimidiam dentium longitudinis producta, plicata; *processus* dentium fere longitudinis, lanceolati, carinati, longitudinaliter rimosi vel diversi; *cilia* singula, breviuscula, laevia; *spori* 0.025–0.030 mm. olivacei, papillosi; *operculum* e basi alte conica breviter rostratum. Calyptra ignota.

LUZON, District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4921 *Merrill*).

Genus novum insigne, caulis et foliorum structura cum genere *Fabronia* omnino conveniens, sed sporogonio longe diversum.

HOOKERIACEÆ.

CALLICOSTELLA C. Müll.

Callicostella papillata (Mont.) Jaeg.

LUZON, Province of Laguna, Mount Maquiling (5148 *Merrill*).

Area: Bengal, Sumatra, Java, Borneo, Pacific Islands.

RHACOPILACEÆ.

RHACOPILUM P. Beauv.

Rhacopilum spectabile Reinw. et Hornsch.

MINDANAO, Lake Lanao, Camp Keithley, alt. 800 m. (824. 883 Mrs. *Clemens*). LUZON, District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4080 *Merrill*).

LESKEACEÆ.

PELEKIUM Mitt.

Pelekium velatum Mitt.

LUZON, Province of Rizal, Bosoboso (Bur. Sci. 1167, 1172 *Ramos*): MINDANAO, Province of Zamboanga (5465 bis *Merrill*).

Area: Sumatra, Java, Borneo, Philippines, Pacific Islands.

THUIDIUM Bryol. Eur.

Thuidium cymbifolium (Doz. et Molk.) Bryol. Jav.

LUZON, Province of Benguet, Baguio, on wet rocks in ravines, alt. 1,360 m. (4914 *Merrill*): District of Lepanto, Mount Data, on earth in forests, alt. 2,120 m. (4931 *Merrill*).

Area: India, Sumatra, Java, Celebes, Tonkin, China, and Japan.

Thuidium glaucinoides Broth. (*Th. glaucinum* Bryol. Jav. nec. Mitt.).

LUZON, Province of Rizal, on rocks by streams (Bur. Sci. 43 *Foxworthy*).

Area: Burma, Natunas, Sumatra, Java, Celebes, Amboina, Tonkin, Formosa, Liu-kiu, New Mecklenburg.

PSEUDOLESKEOPSIS Broth.

Pseudoleskeopsis decurvata (Mitt.) Broth.

LUZON, Province of Bataan, on rocks along streams (For. Bur. 6534 *Curran*).

Area: Japan.

STEREODONTACEÆ.

ECTROPOTHECIUM Mitt.

Ectropothecium callichroides (C. Müll.) Jaeg.

LUZON, Province of Zambales, Mount Pinatubo (*Loher*).

Area: Philippines.

Ectropothecium (Cupressina) rizalense Broth. sp. nov.

Dioicum; gracile, caespitosum, caespitibus laxissimis, depressis, viridibus, nitidis; *caulis* elongatus, repens, per totam langitudinem fasciculatim fusco-radiculosus, laxe foliosus, pinnatim ramosus, ramis adscendentibus, vix ultra 5 mm. longis, valde complanatis, cum foliis usque ad 1.7 mm. latis, haud attenuatis, obtusis; *folia* distichacea, patula, indistincte homomalla, concaviuscula, ovato-lanceolata, breviter acuminata, acuta, marginibus erectis, ubique serrulatis, nervis binis, usque ad quartam partem folii longitudinis productis, cellulis angustissime linearibus, apice minutissime papillosis, basilaribus infimis abbreviatis, alaribus vix ullis; *bracteae perichaetii* internae erectae, ovato-lanceolatae, subulato-acuminatae, integrae; *seta* vix 1 cm. alta, tenuissima, flexuosula, rubella, laevissima; *theca* horizontalis, minutissima, globoso-ovalis, ubique mamillis obtecta, deoperculata nutans, sub ore constricta, fusca; *operculum* e basi depresse conica brevissime rostratum.

LUZON, Province of Rizal, on wet rocks (Bur. Sci. 70 *Foxworthy*).

Species *E. monumentorum* (Dub.) proxima, sed foliis indistincte homomallis, ubique serratis, nervis distinctis necnon operculo breviter rostrato dignoscenda.

Ectropothecium (Cupressina) subintorquatum Broth. sp. nov.

Dioicum; sat gracile, caespitosum, caespitibus densis, rigidis, lutescenti-viridibus, nitidis; *caulis* elongatus, repens per totam longitudinem fasciculatim fusco-radiculosus, dense foliosus, dense et regulariter pinnatim ramosus, ramis vix ultra 5 mm. longis, patulis, dense foliosis, simplicibus, obtusis; *folia* falcata, concaviuscula, e basi subtruncata ovato-lanceolata, breviter subulato-acuminata, marginibus erectis, inferne integris vel minutissime serrulatis, superne argute serrulatis, nervis binis, brevibus, tenuibus vel obsoletis, cellulis angustissime linearibus, laevissimis, basilaribus infimis abbreviatis, alaribus perpaucis, minutis, subquadratis; *bracteae perichaetii* internae e basi vaginante late ovato-lanceolata subulato-acuminatae, subula reflexa, serrulata; *seta* circ. 2.5 cm. alta, tenuis, flexuosula, rubra, laevissima; *theca* nutans vel pendula, turgide ovalis, sicca deoperculata sub ore constricta, atrofusca. Caetera ignota.

LUZON, Province of Laguna, Mount Maquiling (5147 *Merrill*); Province of Benguet, on wet rotten logs in ravines, alt. 1,300 m. (4988 *Merrill*).

Species *E. intorquato* (Doz. et Molk.) affinis, sed bracteis perichaetii serrulatis jam dignoscenda.

Ectropothecium (Vesicularia) campylothecium Broth. sp. nov.

Dioicum; robustiusculum, caespitosum, caespitibus densiusculis, mollibus, sordide lutescenti-viridibus, vernicoso-nitidiusculis; *caulis* elongatus, per totam longitudinem fasciculatim fusco-radiculosus, laxiuscule foliosus, remote et irregulariter pinnatim ramosus, ramis patulis, valde complanatis, 5–10 mm. longis, cum foliis circ. 1.9 mm. latis, vix attenuatis, obtusiusculis, singulis longioribus, parce ramulosis; *folia* disticha, patentia, concaviuscula, caulina oblongo-ovata, lanceolato-acuminata, acuta, marginibus erectis, integris, nervis binis, brevibus, tenuibus vel obsoletis, cellulis laxe hexagono-rhomboideis, chlorophyllosis, laevissimis, basilaribus infimis abbreviatis, laxis, ramea brevius acuminata, apice indistincte serrulata; *bracteae perichaetii* internae a basi vaginante late ovata sensim lanceolato-subulatae, subula brevi, recurvula, integra; *seta* vix ultra 1 cm. alta, tenuis, flexuosula, rubra, laevissima; *theca* plerumque nutans, oblongo-ovalis, junior arcuatula, sicca deoperculata sub ore paulum constricta, fusca; *operculum* e basi convexa apiculatum.

LUZON, Province of Benguet, Baguio, on wet rocks in ravines, alt. 1,360 m. (4923 *Merrill*).

Species *E. Meyeniano* (Hamp.) affinis, sed caule remote et irregulariter pinnato, foliis lanceolato-acuminatis et theca in statu juniore arcuatula dignoscenda.

Ectropothecium Meyenianum (Hamp.)

MINDANAO, Lake Lanao, Camp Keithley, alt. 800 m. (Mrs. *Clemens*).

STEREODON Mitt.

Stereodon (Pseudo-Rhaphidostegium) luzonensis Broth. sp. nov.

Dioicus; sat gracilis, caespitosus, caespitibus densis, mollibus, lutescenti-viridibus, nitidis; *caulis* procumbens, parce fusco-radiculosus, divisus, divisionibus adscendentibus, dense foliosis, pinnatim ramosis, ramis patulis, brevibus, compressulis, singulis longioribus, ramulosis; *folia* falcata, concava, laevia, haud decurrentia, ovata vel ovato-oblonga, breviter acuminata, acuta, marginibus erectis, apice minute serrulatis, enervia, cellulis angustissime linearibus, laevissimis, basilaribus infimis abbreviatis, laxiusculis, incrassatis, aureis, alaribus pluribus magnis, oblongis, vesiculosis, uniseriatis, aureis; *bracteae perichaetii* erectae, haud plicatae, intimae e basi oblonga lanceolato-subulatae, superne serratae; *seta* circ. 2.5 cm. alta, sicca flexuosula, rubra, laevissima; *theca* horizontalis, oblongo-cylindricea, paulum asymmetrica, brevicollis, sicca deoperculata curvatula, sub ore paulum constricta, laevis, fusca; *operculum* e basi conica brevissime curvirostre.

LUZON, District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4938 *Merrill*).

Species *S. curvirostri* (Schwaegr.) Mitt. valde affinis, sed foliis minutius serrulatis, seta longiore et thecae forma dignoscenda.

TAXITHELIUM Spruce.

Taxithelium (Polystigma) alare Broth. sp. nov.

Autoicum; gracile, pallide lutescens, sericeo-nitens; *caulis* ad ramulos longissime repens, per totam longitudinem fusco-radiculosus, densissime pinnatim ramosus, ramis subaequilongis, vix ultra 1 cm., cum foliis vix 2 mm. latis, sursum vergentibus, dense foliosis, valde complanatis, vix attenuatis, obtusis; *folia* distiche patentia, concava, e basi angustata oblongo-lanceolata, filiformi-acuminata, marginibus erectis, superne serrulatis, enervia, cellulis angustissime linearibus, seriatim papillosis, basilaribus infimis brevioribus, laevibus, aureis, alaribus pluribus vesiculosis, aureis; *bracteae perichaetii* erectae, intimae e basi vaginante oblonga lanceolato-subulatae, filiformi-acuminatae, superne serrulatae; *seta* circ. 3 cm. alta, tenuissima, flexuosula, rubra, laevissima; *theca* suberecta, minuta, oblonga, paulum asymmetrica, deoperculata inclinata, sicca sub ore

MINDORO, Mount Halcon (For. Bur. 4476 *Merritt*).

Species distinctissima, forsan cum *T. Lindbergii* (Bryol. Jav.) Ren. et Card. comparenda, sed ramificatione, foliorum structura et seta longissima valde diversa.

Taxithelium instratum (Brid.) Broth.

LUZON, Province of Rizal, Bosoboso, on trees (Bur. Sci. 1168, 1169, 1171, 1173, 1174, 1176, 1177, 1178 *Ramos*).

Taxithelium papillatum (Harv.).

NEGROS, Gimagaan River, on fallen trees in forests, alt. 75 m. (1503 *Whitford*).

Area: Nepal, Siam, Malacca, Java, Banca, Borneo, Celebes, New Guinea, and Pacific Islands.

CTENIDIUM (Schimp.) Mitt.

Ctenidium glaucocarpum (Reinw.) Broth.

LUZON, Province of Pampanga, Mount Abu, on branches, alt. 1,400 m. (Bur. Sci. 1926 *Foxworthy*). MINDANAO, District of Zamboanga, on small trees along streams, alt. 600 m. (1750 *Copeland*).

Area: Sikkim and Java.

MACROTHAMNIUM Fleisch.

Macrothamnium macrocarpum (Reinw. et Hornsch.) Fleisch.

LUZON, District of Lepanto, Mount Data, on trees, alt. 2,120 m. (4878 *Merrill*).

Area: India, Sumatra, Java, Amboina, Borneo.

ACANTHOCLADIUM Mitt.

Acanthocladium Merrillii Broth. sp. nov.

Dioicum; sat gracile, caespitosum, caespitibus densis, lutescentibus, nitidis; *caulis* primarius elongatus, flexuosus, repens, foliis destructis et radiculis obtectus, secundarii densi, erecti, fasciculato- et pinnato-dendroidei, ramis brevibus, dense foliosis, vix compressis, cuspidatis vel obtusis; *folia* caulis secundarii patentia, concaviuscula, e basi late ovata raptim lanceolato-subulata, circ. 2.5 mm. longa et circ. 0.95 mm. lata, marginibus erectis, basi subintegris, superne aculeato-serratis, limbata, nervo nullo, cellulis angustissimis, flexuosulis, ad margines longioribus, magis incrassatis, limbum lutescentem efformantibus, basilaribus infimis aureis, alaribus numerosis, magnis, oblongis, vesiculosis, fusco-aureis, ramea minora, brevius et latius acuminata: *bracteae perichaetii* internae erectae, oblongo-lanceolatae, loriformi-acuminatae, acumine semitorto, aculeato-serratae; *seta* usque ad 5 cm. alta, valde flexuosa, purpurea, laevissima; *theca* horizontalis, magna, oblonga, asymmetrica sicca curvatula, fusca, laevis. *Operculum* ignotum.

LUZON, Province of Tayabas, Atimonan, on wet prostrate rotten logs in forests, alt. 212 m. (3985 *Merrill*).

Species pulcherrima, *A. rigido* (Reinw. et Hornsch.) affinis, sed foliis distincte limbatis jam dignoscenda

SEMATOPHYLLACEÆ.

TRICHOSTELEUM Mitt.

Trichosteleum hamatum (Doz. et Molk.) Jaeg.

LUZON, Province of Pampanga, Mount Abu, alt. 1,400 m. (Bur. Sci. 1927 *Foxworthy*).

Area: Sumatra, Java, Philippines, and the Pacific Islands.

HYPNODENDRACEÆ.

MNIODENDRON Lindb.

Mniodendron fusco-mucronatum (C. Müll.) Broth.

MINDANAO, district of Zamboanga, on trunks and logs along streams, alt. 760 m. (*Copeland*).

Mniodendron divaricatum (Hornsch. et Reinw.) Lindb.

LUZON, Province of Laguna, Mount Banajao, alt. 2,250 m. (*Loher*).

Area: Sumatra, Java, Borneo, and Celebes.

NEW OR INTERESTING PHILIPPINE FERNS: III.

By Edwin Bingham Copeland.
(From the Bureau of Education, Manila, P. I.)

DRYOPTERIS Adanson.

Dryopteris cuspidata (Bl.) Christ, Philip. Journ. Sci. **2** (1907), Bot. 205.

This seems to me a perfectly distinct species, but it certainly includes *Whitford* 272 from Mount Mariveles, referred by *Christ* (l. c. 207) to *D. rubida*, and *Copeland* 2025 from Mount Maquiling, referred by *Christ* (l. c. 205) to *D. urophylla*, as well as *Merritt*, F. B. 6850 and *Merrill* 6093 from Mindoro. Although the fronds often become reddish in drying, they can be distinguished from *D. rubida* by the shape, texture, and venation of the pinnæ, and, in well-developed specimens, by the proliferation.

HEMIGRAMMA Christ.

Hemigramma latifolia (Meyen) Copel.

In a recent collection of normal material of this plant in Zambales by *Curran* (For. Bur. 5802) is found one most remarkable form illustrated by the accompanying photograph (Pl. II). As Christ states, the fertile fronds of this plant are not invariably closely contracted, but this specimen not only has the fertile frond fairly broad, and with irregular margin, but it has fairly definite *sori which are indusiate!* The indusia are partly peltate, but mostly with an overgrown sinus. The plant impresses me as a very remarkable reversion; or it may be a hybrid. In either case it is good evidence as to the affinity of *Hemigramma*, and leads me to believe that this fern originated in *Tectaria* independently of *Leptochilus*, and therefore is properly separated from that genus.

Elmer's 7060 (Pl. III.) is another interesting fern, in the same connection. It can be called *Tectaria crenata* Cav., but the sterile frond has the peculiar mottling of *Hemigramma*, and the fertile frond is reduced, and the sori, while everywhere indusiate, are in places very irregular and disposed to stretch out along the veins. It is the likelihood that this is a hybrid which makes me suspect that *Curran's* plant is also one. We certainly have good ground for the belief that *Tectaria crenata* and *Hemigramma* are nearly related. Plates I and IV illustrate likely parents of such hybrids. Another *Tectaria, T. decurrens* (Presl) Copel., has more nearly the form of *Hemigramma*. It is my opinion that *Hemigramma* had a not very remote common ancestry with both these species of *Tectaria*.

LEPTOCHILUS Kaulfuss.

Leptochilus normalis (J. Sm.) Copel. n. comb. (*Gymnopteris* J. Sm., Hook. Journ. Bot. **3** (1841) 403; *Dendroglossa* Presl, Epim. Bot. 1849, 149; *Leptochilus rizalianus* Christ. Bull. Herb. Boissier II, **6**: (1906), 1004.)

Los Baños, La Laguna, LUZON, *Copeland* 2087; Gimagon River, NEGROS, *Whitford* 1597.

My collection is from the type locality of *L. rizalianus*, Los Baños being at the foot of Maquiling, but neither of them in Rizal Province. We have, moreover, *Christ's* determination of *Whitford's* plant as *L. rizalianus*. I can not see that this plant differs in any detail from *Dendroglossa normalis* Presl. The *L. minor* Fée reported from the Philippines may also be assumed to be this plant, being the same collection, *Cuming* 326, which is the type of this species. The *L. minor* of India and *L. normalis* must be very closely related. Both are very near *L. lanceolatus* Fée, of which *L. normalis* is possibly a variety produced by the environment; but they seem to me to remain distinct when growing near together.

LOMAGRAMMA J. Sm.

Lomagramma pteroides J. Sm. var. **subcoriacea** Copel. var. nova.

Pinnis frondis sterilis subcoriaceis, siccis rubidis, venulis e facie infera praestantibus.

MINDANAO, San Ramon, *Copeland* 1730; Camp Keithley, *Clemens* s. n. PARAGUA, *Merrill* 780.

I have long regarded this plant of the southern islands as a distinct species. But single specimens collected by Mrs. *Clemens* seem to represent still others; and different collections of *Lomagramma* from Luzon and Mindoro vary notably, though each collection is very uniform. More collections are needed before it is possible to decide whether we have a considerable number of species, or a single very variable one.

Lomagramma articulata (J. Sm.) Copel. comb. nov. (*Polybotrya* J. Sm. Journ. of Bot. 3 (1871) 401).

LEYTE, *Cuming;* Camp Keithley, MINDANAO, *Clemens* 1073.

This plant is not *Polybotrya*. It is *Arthrobotrya* J. Sm. 1875, *non Arthrobotrys* Wall. 1828. It is congeneric with "*P.*" *Wilkesiana* and "*P.*" *polyphylla*. A separate genus might be established for these plants; but they are very closely related to *Lomagramma* and I think it better to include them in it. *L. polyphylla* Brack. was originally described in its most proper genus.

L. Wilkesiana (*Polybotrya* Brack., Wilkes Expl. Exped. 16 (1854) 80) stands between *L. polyphylla* and *L. articulata*.

OLEANDRA Cav.

Oleandra colubrina (Blanco) Copel.

This species extends as far as Java, from which island we have almost typical specimens. It is *O. neriiformis* var. *β*, *brachypus* of *Hooker*, Species Filicum, IV, 156, distinguished by having the articulation close to the base of the frond, leaving a pedicel much longer than the stipe. I suspect that it will eventually seem desirable to distinguish several species having this character, two of which are here described as varieties. In the localities where they occur, these varieties are well defined and apparently very stable. There has been much confusion among older species of *Oleandra*, as is illustrated by one of our sheets of *Cuming* 94, labeled *O. neriiformis*, on which 3 thoroughly distinct species are combined. Presl had a similar experience with Cuming's *Oleandra*.

O. colubrina var. **membranacea** Copeland. var. nova.

Pedicello 2–6 mm. alto, stipite 0–0.5 mm.; fronde ca. 20 cm. longa, 25 mm. lata, angustissime caudata, pubescente, ciliata, membranacea: soris vix 1 mm. latis, in seriem irregularem a margine costaque aequidistantem instructis.

Mount Maquiling, 900 m. s. m. *Copeland* P. P. E. 57; Mount Banajao, *Whitford* 999, forma major frondibus 35 cm. longis.

This fern is well characterized by the position of the sori, the texture, and the surface. It is scandent, but has the characteristic stout, stiff stems and clustered leaves of *O. neriiformis* and *O. colubrina*.

There is also on Maquiling an *Oleandra*, collected sterile by Dr. Matthew and myself, which has soriate instead of clustered leaves, with a long pedicel and almost no stipe.

O. colubrina var. nitida Copeland var. nova.

Frondibus usque ad 40 cm longis, 20 mm latis, coriaceo-papyraceis mox glabris, nitidis.

Mount Apo, 1,500 m. s. m., *Copeland* 1474; San Ramon, MINDANAO, *Copeland* 1766, forma minor, aliter non diversa.

DAVALLODES Copeland, genus nov.

(*Microlepia* § *Davallodes* Copel. in Polypodiaceæ of the Philippines, 1905, p. 55.)

Genus Davalliearum, stipitibus articulatis, rhizomate pilis vestito.

The only hitherto known species of this genus was first described as a *Leucostegia*, but afterward transferred to *Microlepia* because of the form of the indusium. As a matter of fact, the genus has no indusial character which will constantly distinguish it from either *Leucostegia* or *Microlepia*. In one species, the indusia may be fastened only across the very broad base; in another they are the narrowest known to me in any Davalliaceous fern, and fastened the whole length of the almost parallel sides. In spite of this diversity of sori, the genus is a very natural one. All three of the species I now know are practically identical in the appearance of their stout, greenish rhizomes, clothed with stiff, bristly, dark hairs with small, peltate bases, and in the remote, broadly lanceolate, finely pubescent, exceedingly thin, pinnate fronds, with the pinnæ deeply and closely pinnatifid, and their segments incised into very sharp secondary segments.

Davallodes is apparently related to both *Microlepia* and *Leucostegia*, having the jointed stipes of the latter, and the rhizome clothed with hairs as in the former. It is known from the Philippines, Celebes, and Borneo.

Sorus broader than long, attached by the base	*D. gymnocarpum*
Indusium half-cup-shaped, attached by sides	*D. hirsutum*
Indusium narrowly half-cylindrical	*D. grammatosorum*

Davallodes hirsutum (J. Sm.) Copeland. (*Leucostegia* J. Sm. nomen; *Microlepia* Presl, Epim. Bot. 1849, p. 97. *Davallia ciliata* Hooker, Sp. Fil. 1, p. 184, Plate 60 A; *Microlepia* Copel. l. c.) This species is founded on a Luzon plant of *Cuming's* collection, which I have not seen. *Elmer's* No. 9028, from Mount Banajao and *Matthew* s. n. from Mount Maquiling are quite typical. A single frond of my collection, from Bagnen, Lepanto-Bontoc, alt. 1,800 meters, differs from *Hooker's* figure in being more lax in habit, with the pubescence less evidently confined to the veins. The indusia are subglabrescent. My collections from near Mount Apo, Mindanao, nos. 1273, 1481, are much less pubescent, the indusia being almost all glabrous. In other respects these plants agree with the published descriptions and figures. The stipe is 10 centimeters, more or less,

in height; the lowest pinnæ moderately reduced, the pinnæ not very acuminate; the segments^{1} obtuse, the lowest acroscopic ones enlarged, but the lowest acroscopic segments^{11} not so.

Davallodes gymnocarpum Copeland sp. nova.

Stipite 3–9 cm alto; fronde 30–40 cm alta, 12–16 cm lata, pinnis majoribus acuminatis, inferioribus sensim valde diminutis, infimis late ovatis 2–3 cm longis; segmentis^{1} oblongis, rotundato-obtusis, infimis (apud rhachides) maximis, ultra mediam laminam incisis; segmentis^{11} falcatis, acutis, ciliatis, infimis aliis aequalibus, integris; soris minutis, ad baseos lobarum; indusiis variabilibus, semper quam altis latioribus, non ciliatis. Tab. V.

Monte Canlaon, Insulae Negros, 600 m. s. m. *Copeland* 2075.

Easily distinguished from *D. hirsutum* by the form of the frond and that of the indusium.

Davallodes grammatosorum Copeland sp. nova.

Stipite ca. 15 cm alto; fronde 40–65 cm alta, 20–26 cm lata, deorsum vix angustata; pinnis valde acuminatis; segmentis^{1} lanceolato-oblongis, obtusis vel subacutis, ultra mediam laminam incisis, infimis majoribus; segmentis^{11} oblongo-lanceolatis, falcatis, non ciliatis, infimis acroscopicis maximis furcato-venosis et interdum plurisoratis; indusio ca. 0.7 mm longo, lineari-oblongo, nudo. Tab. VI.

San Ramon, Insulae Mindanao, 600 m. s. m. *Copeland* 1724; Camp Keithley, *Clemens* 1137.

This is the "*Microlepia hirsuta*" of my "Comparative Ecology of San Ramon Polypodiaceae."

DENNSTAEDTIA Bernhardi.

Dennstaedtia dennstaedtioides Copel., var. **arthrotricha** Copel. var. nova.

Varietas rhachi superficieque laminae pilis articulatis, i. e., cellulis alternantibus ad lineas tenuissimas contractis, pubescentibus, lamina ampliore, aliter typo non diversa.

Mount Bulusan, Benguet, LUZON, 2,200 m. s. m. *Copeland* 1934.

ASPLENIUM L.

Asplenium filipes Copel. sp. nova.

Asplenium *A. unilaterali* affine et eo derivatum. Rhizomate per terram humidam repente, 1 mm crasso, apice squamuloso; stipitibus seriatis, 5 cm altis, filiformibus, purpureo-nitidis; fronde 8–12 cm alta, 2 cm lata, acuminata, pinnata; pinnis utroque latere ca. 15, infimis horizontalibus vix diminutis, superioribus adscendentibus, usque ad 15 mm longis, 3–4 mm latis, obliquis vix auriculatis, lamina infra costam fere carentibus, margine ea recta, margine acroscopica serrata dentibus paucis, glabris, membranaceis; soris paucis, brevibus.

Mount Mariveles, 1,200 m. s. m. *Copeland*, P. P. E. 73.

A. filipes, var. minutum Copel. var. nova.

Stipitibus 1–3 cm. frondibus 4–7 cm. altis; lamina diaphana, soro in pinna quaque uno, interdum duobus.

Mount Canlaon Ins. Negros, 600 m. s. m. *Copeland* 2065.

This species differs from *A. unilaterale* Lam., the type and probable parent of the group, in its size, narrow pinnæ with straight inferior margin, and sparse sori, in all which respects it is nearer to Japanese than to Philippine or Malayan plants of the parent species. Growing with the var. *minutum* were some larger plants with exceedingly thin pinnæ shaped more like those of *A. unilaterale;* these were uniformly sterile, and as plants referable to *A. unilaterale* were also near, were very likely hybrids.

WOODWARDIA Smith.

Woodwardia radicans Sm. var. **prolifera** H. & A.

Batan Id., *Feniæ*, Bur. Sci. 3773.

This very curious plant has not before been found south of Formosa.

LOXOGRAMME Presl.

Loxogramme involuta Presl, var. **gigas** Copeland var. nova.

Loxogramme frondibus usque ad 65 cm longis, 8 cm latis, caudatis, vix involventibus, marginibus subcrispis, fructificatione laxa.

Majayjay, La Laguna, ad saxa humida super fluminem Dalitiuan, 250 m. s. m. *Copeland* 2085, *Elmer.*

This is conspicuously distinct in appearance from ordinary *L. involuta;* but some of our specimens of the latter approach it sufficiently so that I do not care to try to distinguish it specifically. As in other Philippine specimens of *L. involuta,* there are free included veinlets.

Loxogramme grandis (Racib.) Copel. n. comb. (*Gymnogramme grandis* Racib. in Pteridophyten von Buitenzorg 1898, 72) is most easily distinguished from this variety by having a long stipe.

POLYPODIUM L.

Polypodium millefolium Bl.

Mount Malindang, 200 m. s. m. *Mearns and Hutchinson* For. Bur. 4647.

Java.

The Malindang plant is deeply tripinnatifid, and the texture is almost coriaceous, but I do not believe it is separable. Small fronds are almost like *Blume's* figure in Fl. Jav., *pl.* 88.

Polypodium Oodes Kze.

Polypodium Rudimentum Copel. in Perkins' Fragmenta 1905, 190, is this species. While *Elmer's* collection, on which *P. Rudimentum* was based, was quite uniform, *Williams'* from the same vicinity contains also typical *P. Oodes* and intermediate forms. Mr. Maxon kindly called my attention to this fact, and showed me *Williams'* plants.

Polypodium rivulare Copel. Philip. Journ. Sci. I (1906) Suppl. 163 is not distinct from *P. dolichopterum* Copel. l. c. p. 162. I have at hand more than one hundred specimens and in so rich a collection the two forms run together.

I do not know *P. pentaphyllum* except by the description, by which I do not see how to refer any of these specimens to it. *P. insigne* Bl., which I have collected in Negros, is quite distinct.

DRYOSTACHYUM J. Smith.

Dryostachyum pilosum J. Sm.

A plant collected at Camp Keithley by Mrs. *Clemens* has the apex vegetative, but several pairs of intermediate pinnæ partly or completely fertile, their surface only moderately reduced.

DRYNARIA (Bory) J. Sm.

Drynaria descensa Copeland sp. nova.

Species *D. quercifoliae* affinis; rhizomate 5–10 cm. crasso, paleis peltatis caduco-aristulatis armato, apice mamminforme; frondibus conchoideis siccis, duris, brunneis vel infra griseo-nitidis, 5–10 cm. longis, ovatis, leviter crenato-lobatis, cordatis lobis basalibus imbricatis; frondibus fertilibus 40–60 cm. longis, segmentis infimis diminutis et ad petiolum usque pedem alatum decurrentibus, segmentis majoribus 10–20 cm. longis, 12–25 mm. latis, crenatis, acuminatis, costam versus paullo angustatis, ala angusta ca. 4 cm. longa connexis, papyraceo-coriaceis, glabris; venatione sorisque ut *D. quercifoliae.*

LUZON, Prov. Nueva Ecija, 100 m. s. m., ad terram repens, interdum ad truncos arbuscularum 1–2 m. scandens, *Copeland* 2061; Rizal, *Guerrero* 3, frons fertilis.

A plant well characterized by the small humus-collecting scale-leaves, and the segments of the normal frond narrowed toward the base and separated by twice their own breadth. The reduction of the scale-frond with the assumption of the terrestrial habit occurs also in *D. Delavayi*, *D. reducta*, and *D. sinica*, Chinese species in another section of the genus.[1]

LYGODIUM Swartz.

Lygodium Matthewi Copel. sp. nova.

Lygodium maximum rhachidibus volubilibus 5 mm crassis, alte (9 m) scandentibus, pinnis $^{\mathrm{I}}$ sessilibus; pinnis $^{\mathrm{II}}$ ultra 50 cm longis, ubique glabris vel venis ad baseos pinnularum infra pubescentibus; pinnulis utroque latere 1–2, petiolulis 1.5–2.5 cm longis, vix vel haud articulatis, inaequilateraliter cordatis, in segmentis 2–3 20 cm longis furcatis; pinnula terminale cordato-cuneata, in segmentis ca. 6 patentibus 20–30 cm longis 3–4 cm latis acuminatis profunde palmata, serrulata, herbacea; venulis anastomosantibus, fronde fertile invisa.

Mount Maquiling, 300 m. s. m., *C. G. Matthew.*

The Philippine relative of this giant, *L. Merrilli* Copel., Philip. Journ. Sci. 2, Bot. (1907), 146, has pinnæ $^{\mathrm{II}}$ 25–30 cm. long, pinnules truncate, segments about 1.5 cm. wide, and but 2–4 segments of the terminal pinnule.

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[1] Christ, in Bull. Soc. Bot. France 22, Mem. 1 (1905), 23.

L. Mearnsii Copel. sp. nova.

Species gregis *L. flexuosi* et *L. japonici;* petiolo pinnae$^{\text{I}}$ 5–9 mm longo; pinnis$^{\text{II}}$ sterilibus, circiter 15 cm longis, 12–18 cm. latis; pinnulis utroque latere 2–3, majoribus cum petiolulis plus quam 1 cm longis, pinnatis; pinnulis$^{\text{II}}$ (pinnis$^{\text{IV}}$) utroque latere 1, pedicellata, quinquefida segmentis obtusis, terminale majore lanceolata obscure crenata et crenulis denticulatis, glabris, herbaceis; venulis liberis, praestantibus; pinnis fertilibus minoribus, pinnulis$^{\text{II}}$ ovatis integrioribus, spicis oblongis brevibus planis.

Insula Batan, *Mearns* Bur. Sci., 3136.

A species nearer on the whole to *L. japonicum* than to *L. flexuosum*, though the fertile pinnules$^{\text{II}}$ are less cut than the sterile; recognizable by the long petiole of the pinna$^{\text{I}}$, the generally obtuse segments, salient venation, and broad, flat spikes.

ILLUSTRATIONS.

PLATE I. *Hemigramma latifolia* (Meyen) Copel.
II. *H. latifolia*; reversion or hybrid.
III. Probable hybrid of *H. latifolia* and *Tectaria crenata* Cav.
IV. *Tectaria crenata* Cav.
V. *Davallodes gymnocarpum* Copel. × 2.
VI. *D. grammatosorum* Copel. × 2.

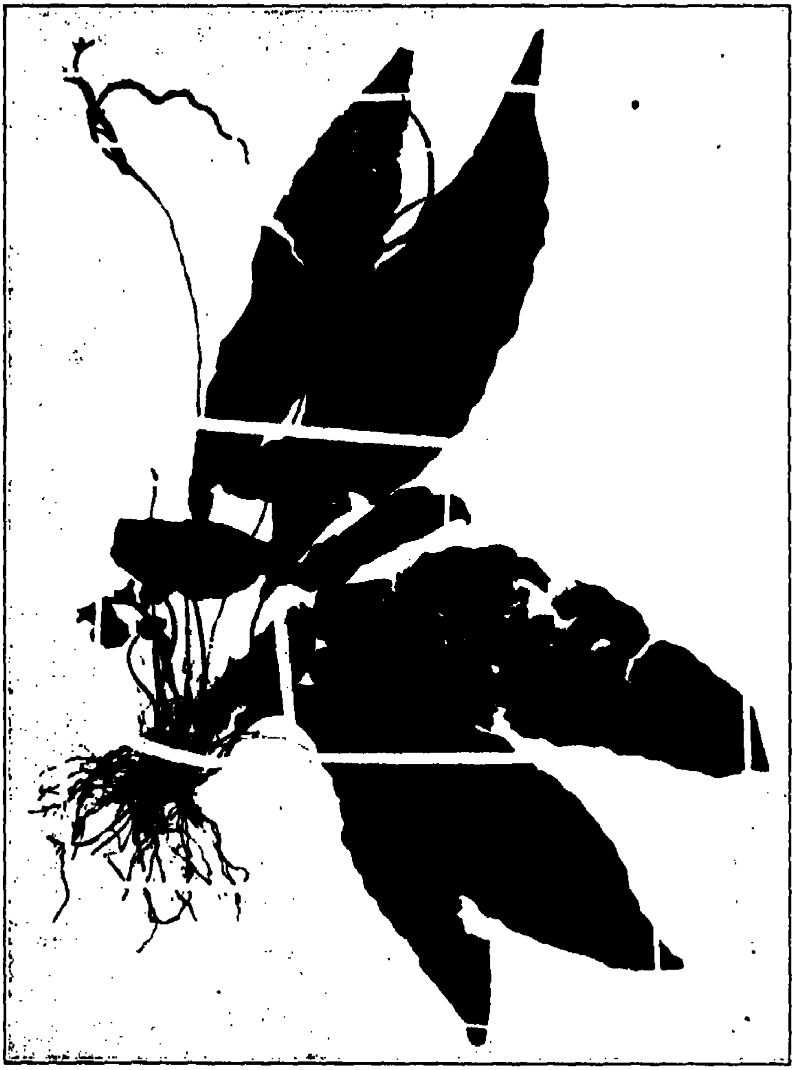

PLATE I.

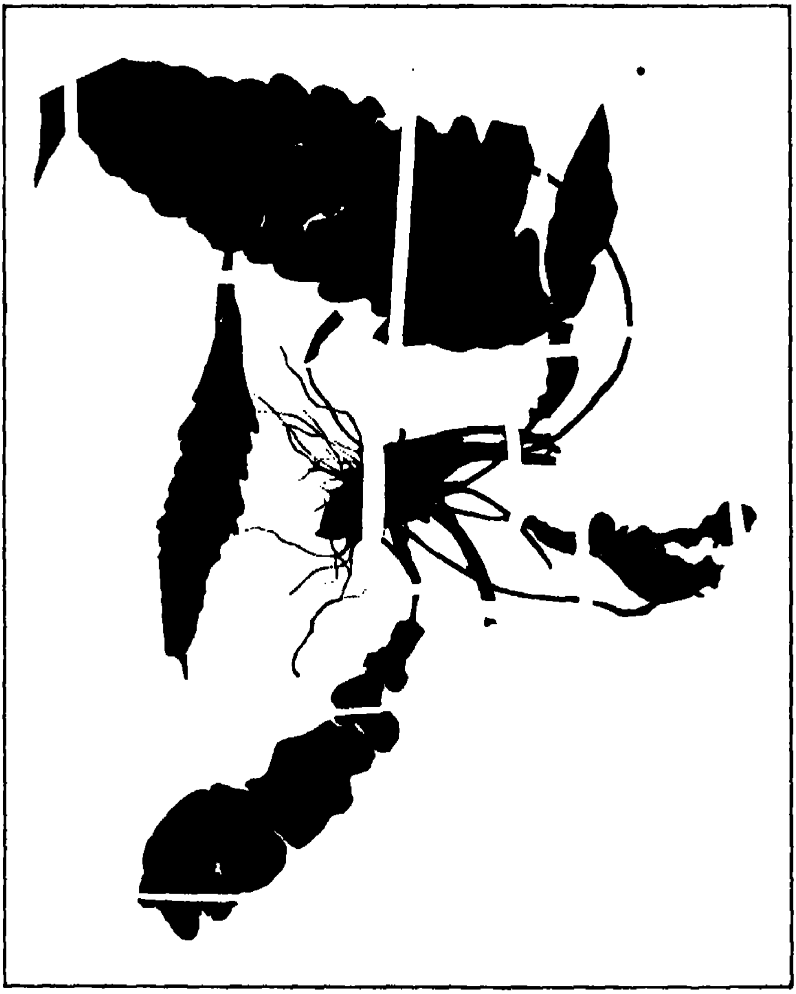

PLATE II.

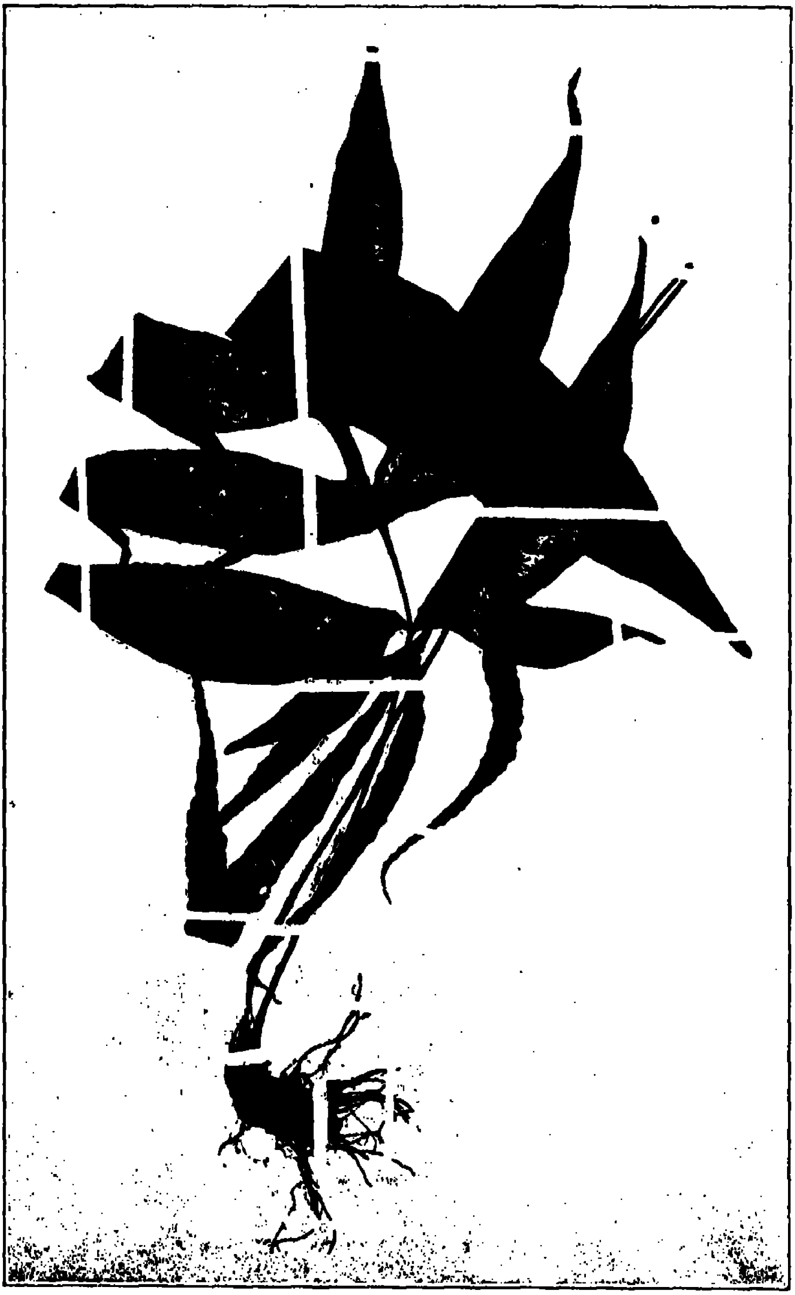

PLATE III.

PLATE IV.

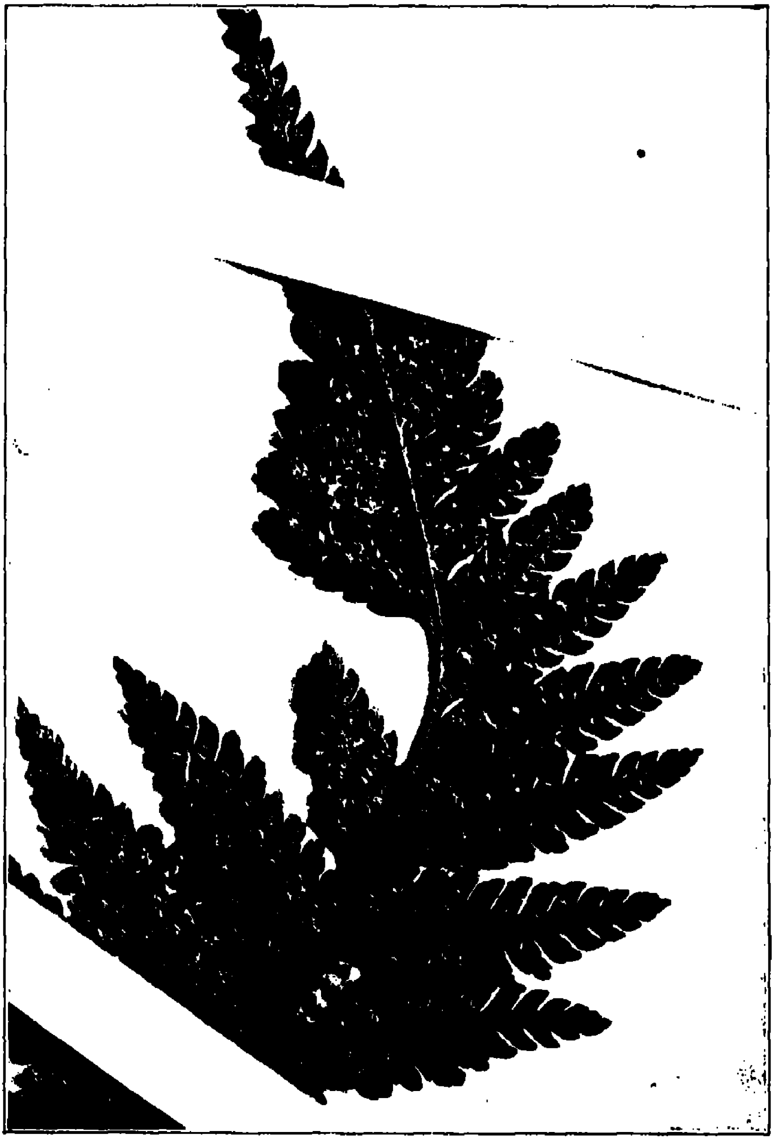

PLATE V.

PLATE VI.

The Philippine Agricultural Review

A MONTHLY ILLUSTRATED REVIEW PRINTED IN ENGLISH AND SPANISH AND PUBLISHED BY THE BUREAU OF AGRICULTURE FOR THE PHILIPPINE ISLANDS.

Edited by G. E. NESOM, Director of Agriculture.

The Philippine Agricultural Review, a newly established publication of the Bureau of Agriculture, will take the place of the press bulletins heretofore issued by that Bureau. It will not be a technical journal, but rather a popular serial publication on general agriculture. The primary object of the *Review* is to furnish an educational means of reaching the people of the Philippine Islands with the work of the Bureau of Agriculture.

The first number of the *Review* is devoted entirely to the annual report of the Bureau of Agriculture for the past fiscal year. This report is so published for the purpose of giving to persons interested in Philippine agriculture a comprehensive idea of the organization, scope, and extent of the work of that Bureau. Succeeding numbers will contain reports on agricultural conditions in different parts of the Philippine Islands, articles on tropical agriculture, and other material of interest to readers of agricultural literature.

Volume I, beginning January, 1908, will be issued monthly, and will be circulated free of charge in the Philippine Islands. A limited number of copies will be sent free to foreign workers along agricultural lines in recognition of valuable services rendered the Bureau of Agriculture. Should there appear to be a demand for regular foreign subscriptions, arrangements will be perfected later for furnishing them at a reasonable price.

Persons receiving the Philippine Agricultural Review are invited to submit material for publication. Any reports, articles, or notes on agricultural subjects will receive careful consideration and, as far as practicable, will be published.

Applicants for the *Review* should state whether the English or the Spanish edition is desired. Address all communications relative to this publication to the DIRECTOR OF THE BUREAU OF AGRICULTURE, MANILA, P. I.

Harry M. Ickis, E. M.

DIVISION OF MINES
BUREAU OF SCIENCE

April the first
1908

THE PHILIPPINE

JOURNAL OF SCIENCE

C. BOTANY

VOL. III JUNE, 1908 No. 2

FUNGI PHILIPPINENSES, I.

Auctore P. HENNINGS.

(Am Königlichen Botanischen Museum, Dahlem bei Berlin.)

USTILAGINACEÆ.

SPHACELOTHECA De Bary.

Sphacelotheca Hydropiperis (Schum.) De Bary Vergl. Morph. Pilze (1884) 187.

LUZON, Prov. Benguet, Pauai, in flor. *Polygoni* sp., *Merrill 4962*, Oct.-Nov., 1905.

CINTRACTIA Cornu.

Cintractia axicola (Berk.) Cornu in Ann. Sci. Nat. VI **15** (1883) 279.

LUZON, Prov. Bulacan, in axill. *Fimbristylis*, *A. E. Yoder*, Aug., 1906.

Cintractia Merrillii P. Henn. sp. nov.

Soris ovaria destruentibus efformantibusque, subglobosis, duris, compactis, fusco-olivaceis, pilis rigidis, flexuosis, pallide olivaceis echiniforme asperatis, sporis subglobosis vel ellipsoideis angulatis, 7–10x6–9 μ, episporio olivaceo, ca. 2 μ crasso radiato-striatulo.

LUZON, Prov. Benguet, Pauai, 2,000 m. s. m., in ovariis *Caricis* sp., *Merrill 4915*, Oct.-Nov., 1906.

Cintractia Cyperi-polystachyi P. Henn. sp. nov.

Soris oblonge effusis atris primo tectis compactis e pedunculis tumentibus; sporis subglobosis vel ellipsoideis angulatis, pluriguttulatis, 7–11 x6–9 μ; episporio fusco-olivaceo, ca. 0.5 μ crasso, laevi.

LUZON, Manila, in pedunculis *Cyperi polystachyi*, *Merrill 5195*, Aug., 1906.

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LUZON, Manila, in pedunculis *Cyperi polystachyi*, *Merrill 5195*, Aug., 1906.

TUBERCULINA Sacc.

Tuberculina persicina (Dittm.) Sacc. Fung. Ital. *t. 964*.
BANTON, in aecidio in *Hewittia bicolore*, *Merrill 4164*, Julio, 1905.

UREDINACEAE.

UROMYCES Link.

Uromyces Hewittiae Syd. in Ann. Mycol. 4: 30.
BANTON, aecidia in foliis *Hewittiae bicoloris*, *Merrill 4164*, Julio, 1905.

PUCCINIA Pers.

Puccinia purpurea Cooke in Grev. 5 (1876) 15.
MINDANAO, Lake Lanao, Camp Keithley, in foliis *Sorghi halepensis*, *Clemens* 1," Junio, 1906.

Puccinia rufipes Diet. in Engl. Bot. Jahrb. 32 (1902) 48.
LUZON, Manila, in foliis *Imperatae arundinaceae*, *Copeland 44*, Dec., 1903.

Puccinia Merrillii P. Henn. sp. nov.

Maculis rotundatis, fuscidulis, zona rufo-brunnea cinctis; teleutosoris ypophyllis circulariter dispositis, firmis, ferrugineis; teleutosporis oblon-is apice haud incrassatis, rotundatis, interdum aristulatis, medio septatis aulo constrictis, citrinis vel subaurantiacis, laevibus, 35–60x17–21 μ; edicello medio inflato, longitudinaliter obscuriore subsulcato, flavido, 0–80x20–25 μ.

MINDORO, monte Halcon, in foliis *Smilacis vicariae* Kth., *Merrill 6151*, Nov., 1906.

Puccinia Thwaitesii Berk. in Journ. Linn. Soc. Bot. 14 (1873) 10.
LUZON, Prov. Bataan et insula Palmas, in foliis *Justiciae gendarussae*, *Merrill 3552, 5345*, Oct., 1903 et 1906.

Puccinia heterospora Berk. et Curt. in Journ. Linn. Soc. Bot. 10: 356.
LUZON, Prov. Rizal, in foliis *Sidae mysorensis*, *Bur. Sci. 118 Foxworthy*, Jan., 1906.

HEMILEIA Berk. et Broome.

Hemileia vastatrix Berk. et Broome in Gard. Chron. (1869) 1157.
LUZON, Prov. Benguet, Baguio, in foliis *Coffeae arabicae*, *Merrill 4918*. MINDANAO, Prov. Zamboanga, *Merrill 5471*.

COLEOSPORIUM Lév.

Coleosporium Merrillii P. Henn. sp. nov.

Maculis fuscis effusis, uredosoris hypophyllis, sparse gregariis, pulvinatis, epidermide flavido tectis dein velatis; uredosporis subglobosis vel ellipsoideis, flavo-fuscidulis vel hyalinescentibus, dense verrucosis, 13–25 x10–20 μ; teleutosoris hypophyllis, gregariis, compactis, rufo-brunneis, rotundato- vel oblongo-pulvinatis; teleutosporis clavatis, vertice rotundatis, 3-septatis haud constrictis, pallidis, 50–100x17–25 μ.

LUZON, Prov. Benguet, Baguio, in foliis orchidis, *Merrill 4906*, Oct., 1905. *C. Bletiae* Diet. affinis, sed uredosporis distinctum.

UREDO Pers.

Uredo philippinensis Sydow in Ann. Mycol. (1906) 32.
Luzon, Manila, in foliis *Cyperi polystachyi*, *Copeland 43*, Dec., 1903.

Uredo Rostrupii P. Henn. (*U. Fuirenae* Rostr. in Bot. Tidsk. Copenhagen 24 (1902) 205, non *U. Fuirenae* P. Henn. Hedw. (1800) 70.)
Panay, Iloilo, in foliis *Fuirenae glomeratae*, *Copeland 84*.

Uredo Arthraxonis-ciliaris P. Henn. sp. nov.

Maculis flavidis oblongis effusis; uredosoris hypophyllis, oblongis interdum striiformibus flavo-brunneolis, epidermide pallida fissa velatis; uredosporis subglobosis vel ellipsoideis interdum ovoideis, flavo-brunneis, minute aculeatis, 16–25x10–22 μ; paraphysibus clavatis, flavo-brunneis saepe curvulis, 30–60x10–30 μ.

Luzon, Prov. Benguet, Kabayan, in foliis *Arthraxonis ciliaris*, *Merrill 4949*, Oct., 1905.

Uredo Castaneae P. Henn. sp. nov.

Maculis rotundatis vel effusis, fuscidulis; soris hypophyllis gregariis minutis, farinosis, epidermide fissa velatis; uredosporis ovoideis vel ellipsoideis flavido-hyalinis, echinatis, 12–20x8–12 μ.

Luzon, Distr. Lepanto, Balili, in foliis *Castaneae vulgaris*, cult., *Merrill 4874*, Nov., 1905.

Uredo Knoxiae P. Henn. sp. nov.

Maculis fuscidulis vel indeterminatis; soris hypophyllis sparsis vel gregariis, rotundatis, pulvinatis, pallidis, farinosis; uredosporis subglobosis, ellipsoideis vel ovoideis, granulato-verrucosis, flavo-hyalinescentibus, 13–20x10–15 μ.

Luzon, Prov. Benguet, flumine Bued, in foliis *Knoxiae corymbosae*, *Merrill 4970*, Oct., 1905.

Uredo Wedeliae-biflorae Syd. Ann. Mycol. (1906) 30.
Samar, Lanang, in foliis *Wedeliae biflorae*, *Merrill 5230*, Oct., 1906.

Uredo Fici Cass. Cat. Pl. Mars. 2: 87 ?
Balut, in foliis *Fici minahassae*, in societ. *Phyllachorae*, *Merrill 5422*, Oct., 1906.

Uredo Abri P. Henn. sp. nov.

Maculis fuscidulis effusis; soris hypophyllis gregariis sparsis minutis, ferrugineis, epidermide fissa velatis; uredosporis subglobosis vel ellipsoideis, verrucosis, brunneis, 15–20x13–18 μ, paraphysibus clavatis, apice brunneis, incrassatis, 30–60x8–12 μ.

Panay, Iloilo, in foliis *Abri precatorii*, *Copeland 87*, Jan., 1904. *U. Kaembachio* P. Henn. distincta.

AECIDIUM Pers.

Aecidium Clerodendri P. Henn. in Engl. Bot. Jahrb. 15: 6.
Luzon, Prov. Nueva Ecija, San Isidro, in foliis *Clerodendri calamatosi*, *Merrill 4198*, Sept., 1905.

TUBERCULINA Sacc.

Tuberculina persicina (Dittm.) Sacc. Fung. Ital. *t. 964.*
BANTON, in aecidio in *Hewittia bicolore, Merrill 4164*, Julio, 1905.

UREDINACEÆ.

UROMYCES Link.

Uromyces Hewittiae Syd. in Ann. Mycol. **4**: 30.
BANTON, aecidia in foliis *Hewittiae bicoloris, Merrill 4164*, Julio, 1905.

PUCCINIA Pers.

Puccinia purpurea Cooke in Grev. **5** (1876) 15.
MINDANAO, Lake Lanao, Camp Keithley, in foliis *Sorghi halepensis, Clemens "A,"* Junio, 1906.

Puccinia rufipes Diet. in Engl. Bot. Jahrb. **32** (1902) 48.
LUZON, Manila, in foliis *Imperatae arundinaceae, Copeland 44*, Dec., 1903.

Puccinia Merrillii P. Henn. sp. nov.

Maculis rotundatis, fuscidulis, zona rufo-brunnea cinctis; teleutosoris hypophyllis circulariter dispositis, firmis, ferrugineis; teleutosporis oblongis apice haud incrassatis, rotundatis, interdum aristulatis, medio septatis paulo constrictis, citrinis vel subaurantiacis, laevibus, 35–60x17–21 μ; pedicello medio inflato, longitudinaliter obscuriore subsulcato, flavido, 50–80x20–25 μ.

MINDORO, monte Halcon, in foliis *Smilacis vicariae* Kth., *Merrill 6151*, Nov., 1906.

Puccinia Thwaitesii Berk. in Journ. Linn. Soc. Bot. **14** (1873) 19.
LUZON, Prov. Bataan et insula Palmas, in foliis *Justiciae gendarussae, Merrill 3552, 5345*, Oct., 1903 et 1906.

Puccinia heterospora Berk. et Curt. in Journ. Linn. Soc. Bot. **10**: 356.
LUZON, Prov. Rizal, in foliis *Sidae mysorensis, Bur. Sci. 118 Foxworthy*, Jan., 1906.

HEMILEIA Berk. et Broome.

Hemileia vastatrix Berk. et Broome in Gard. Chron. (1869) 1157.
LUZON, Prov. Benguet, Baguio, in foliis *Coffeae arabicae, Merrill 4913.* MINDANAO, Prov. Zamboanga, *Merrill 5471.*

COLEOSPORIUM Lév.

Coleosporium Merrillii P. Henn. sp. nov.

Maculis fuscis effusis, uredosoris hypophyllis, sparse gregariis, pulvinatis, epidermide flavido tectis dein velatis; uredosporis subglobosis vel ellipsoideis, flavo-fuscidulis vel hyalinescentibus, dense verrucosis, 13–25 x10–20 μ; teleutosoris hypophyllis, gregariis, compactis, rufo-brunneis, rotundato- vel oblongo-pulvinatis; teleutosporis clavatis, vertice rotundatis, 3-septatis haud constrictis, pallidis, 50–100x17–25 μ.

LUZON, Prov. Benguet, Baguio, in foliis orchidis, *Merrill 4906*, Oct., 1905. *C. Bletiae* Diet. affinis, sed uredosporis distinctum.

UREDO Pers.

Uredo philippinensis Sydow in Ann. Mycol. (1906) 32.

LUZON, Manila, in foliis *Cyperi polystachyi, Copeland 43*, Dec., 1903.

Uredo Rostrupii P. Henn. (*U. Fuirenae* Rostr. in Bot. Tidsk. Copenhagen 24 (1902) 205, non *U. Fuirenae* P. Henn. Hedw. (1899) 70.)

PANAY, Iloilo, in foliis *Fuirenae glomeratae, Copeland 84.*

Uredo Arthraxonis-ciliaris P. Henn. sp. nov.

Maculis flavidis oblongis effusis; uredosoris hypophyllis, oblongis interdum striiformibus flavo-brunneolis, epidermide pallida fissa velatis; uredosporis subglobosis vel ellipsoideis interdum ovoideis, flavo-brunneis, minute aculeatis, 16–25x10–22 μ; paraphysibus clavatis, flavo-brunneis saepe curvulis, 30–60x10–30 μ.

LUZON, Prov. Benguet, Kabayan, in foliis *Arthraxonis ciliaris, Merrill 4949*, Oct., 1905.

Uredo Castaneae P. Henn. sp. nov.

Maculis rotundatis vel effusis, fuscidulis; soris hypophyllis gregariis minutis, farinosis, epidermide fissa velatis; uredosporis ovoideis vel ellipsoideis flavido-hyalinis, echinatis, 12–20x8–12 μ.

LUZON, Distr. Lepanto, Balili, in foliis *Castaneae vulgaris*, cult., *Merrill 4874*, Nov., 1905.

Uredo Knoxiae P. Henn. sp. nov.

Maculis fuscidulis vel indeterminatis; soris hypophyllis sparsis vel gregariis, rotundatis, pulvinatis, pallidis, farinosis; uredosporis subglobosis, ellipsoideis vel ovoideis, granulato-verrucosis, flavo-hyalinescentibus, 13–20x10–15 μ.

LUZON, Prov. Benguet, flumine Bued, in foliis *Knoxiae corymbosae, Merrill 4970*, Oct., 1905.

Uredo Wedeliae-biflorae Syd. Ann. Mycol. (1906) 30.

SAMAR, Lanang, in foliis *Wedeliae biflorae, Merrill 5230*, Oct., 1906.

Uredo Fici Cast. Cat. Pl. Mars. 2: 87 ?

BALUT, in foliis *Fici minahassae*, in societ. *Phyllachorae, Merrill 5422*, Oct., 1906.

Uredo Abri P. Henn. sp. nov.

Maculis fuscidulis effusis; soris hypophyllis gregariis sparsis minutis, ferrugineis, epidermide fissa velatis; uredosporis subglobosis vel ellipsoideis, verrucosis, brunneis, 15–20x13–18 μ, paraphysibus clavatis, apice brunneis, incrassatis, 30–60x8–12 μ.

PANAY, Iloilo, in foliis *Abri precatorii, Copeland 87*, Jan., 1904. *U. Kaembachio* P. Henn. distincta.

AECIDIUM Pers.

Aecidium Clerodendri P. Henn. in Engl. Bot. Jahrb. 15: 6.

LUZON, Prov. Nueva Ecija, San Isidro, in foliis *Clerodendri calamatosi, Merrill 4198*, Sept., 1905.

Aecidium Plucheae P. Henn. sp. nov.

Maculis fuscis, rotundatis, aecidiis hypophyllis sparsis; pseudoperidiis sparsis vel aggregatis, cupulatis, pallidis, margine fimbriatis, contextu cellulis polyedricis, hyalino-fuscidulis reticulatis; aecediosporis subgloboso-angulatis, 14–15 μ hyalino-fuscidulis.

PANAY, Iloilo, in foliis *Plucheae indicae*, *Copeland 88, 89*, Jan., 1904.

Aecidium Blumeae P. Henn. sp. nov.

Maculis rotundatis vel effusis, flavo-brunneis; aecidiis hypophyllis in villo nidulantibus, sparsis vel gregariis, pallidis, cupulatis, margine fimbriatis, contextu cellulis polyedricis reticulatis; aecidiosporis subgloboso-angulatis, laevibus, subhyalinis, 10–15 μ.

LUZON, Distr. Lepanto, Cervantes ad Mancayan in foliis *Blumeae balsamiferae*, *Merrill 4930*, Nov., 1905.

Aecidium Uvariae-rufae P. Henn. sp. nov.

Maculis rotundatis rufo-brunneis, margine flavo-fuscidulis; spermagoneis punctiformibus atris; aecidiis hypophyllis sparse gregariis, cupulatis, flavido-fuscidulis, cellulis contextu polyedricis reticulatis; aecidiosporis subglobosis, angulatis, hyalino-fuscidulis, 15–18 μ.

LUZON, Prov. Cavite, Maragondong, in foliis *Urariae rufae*, *Merrill "D."* Julio, 1905.

PERISPORIACEÆ.

PARODIELLA Speg.

Parodiella pumila (Cooke) Sacc. Syll. 1: 718.

LUZON, Prov. Benguet, in foliis *Crotalariae* sp. et *Smithiae ciliatae*, *Merrill 4948, 4969*, Nov., 1905.

DIMEROSPORIUM Fckl.

Dimerosporium mindanaense P. Henn. sp. nov.

Maculis mycelii effusis, atris; hyphis repentibus ramosis, fuscis, in societate *Meliolae*; peritheciis subglobosis, atro-cellulosis, 60–80 μ diam.; ascis clavatis, obtusis, paraphysatis, 8-sporis, 22–30x8–10 μ; sporis subdistichis, ovoideis, constrictis, hyalinis, 9–12x3 μ.

MINDANAO, Davao, in foliis *Eugeniae* sp., *Copeland 312*, Mar., 1904.

MELIOLA Fries.

Meliola cfr. **amphitricha** Fries, Elen. Fung. 2: 109.

LUZON, Prov. Benguet, flumine Bued, in foliis *Viburni odoratissimi*, *Merrill 4960*, Nov., 1905.

HYPOCREACEÆ.

MEGALONECTRIA Speg.

Megalonectria pseudotrichia (Schwein.) Speg. Fung. Arg. Pug. 4: 211.

LUZON, Prov. Rizal, conidia in ramulis siccis *Pithecolobii dulcis*, *Bur. Sci. 14 Foxworthy*; Manila, in ramulis emortuis *Hibisci rosae-sinensis*, *Merrill 4116*, Julio, 1905. PANAY, *Copeland*.

CALONECTRIA De Not.

Calonectria Copelandii P. Henn. sp. nov.

Peritheciis hypophyllis sparsis vel subgregariis, sphaeroideis papillatis lein collapsis aurantiacis, 200–250 μ; ascis fusoideis vel clavatis, saepe curvulis, apice acutiusculis, 8-sporis, 40–60x10–14 μ; sporis oblique monostichis vel subdistichis, cylindraceo-fusoideis, hyalinis, 7-septatis, 20–26 x4–4.5 μ.

MINDANAO, Santa Cruz, in foliis orchidis no. 1316, *Copeland 1317*, April, 1904.

HYPOCRELLA Sacc.

Hypocrella Schizostachyi P. Henn. sp. nov.

Stromatibus hemisphaerico-tuberosis, carnoso-lignosis, duris, botryose verrucosis, cinereo-testaceis, intus subaurantiacis, ca. 1.5–2 cm diam.; peritheciis immersis ovoideis, ostiolis punctiforme-prominulis, rufo-brunneis; ascis cylindraceis vertice hemisphaerico-rotundatis 8-sporis, 100–160 x6–8 μ; sporis filiformibus pluriseptatis mox in asco secedentibus, cellulis cylindraceis, 5–8x1.5–2 μ, hyalinis.

LUZON, Prov. Rizal, in ramulis vivis *Schizostachyi* sp., *Bur. Sci. 46 Foxworthy*, Jan., 1906.

DOTHIDEACEÆ.

PHYLLACHORA Nitch.

Phyllachora graminis (Pers.) Fckl. Symb. Myc. 216.

LUZON, Manila, in foliis *Andropogonis sorghi*, *Merrill 5150*, Mart., 1906. Perithecia immatura.

Phyllachora Kärnbachii P. Henn. in Engl. Bot. Jahrb. 18 (1904) 39.

P. Merrillii Ricker in Philip. Journ. Sci. 1 (1906) Suppl. 280.

MINDORO, Bulalacao et monte Halcon in foliis *Fici* sp. Merrill no. 927, et *Fici heterophyllae*, *Merrill 3579, 5625*. SAMAR, Lanang, in foliis *Fici* sp., *Merrill 5238*, Oct., 1906.

Phyllachora Fici-minahassae P. Henn. sp. nov.

Maculis nullis, stromatibus epiphyllis sparsis vel gregarie confluentibus, atro-carbonaceis, opacis vel subnitentibus, angulato-pulvinatis; ascis clavatis, obtusis, 8-sporis, paraphysatis, 45–60x10–16 μ; sporis oblongis utrimque obtusis, intus guttulatis, hyalinis 13–16x5–6.5 μ.

BALUT, in foliis *Fici minahassae*, *Merrill 5422*, Oct., 1906.

Phyllachora Canarii P. Henn. sp. nov.

Stromatibus amphigenis gregarie sparsis, rotundatis planis, 1.5–2.5 mm diam., atris, subverrucoso-striolatis; loculis immersis, subglobosis, plurimis; ascis clavatis vertice obtusiusculis, paraphysatis, 8-sporis, 50–80 x7–10 μ; sporis monostichis vel subdistichis oblonge subfusoideis, utrinque obtusis, guttulatis, hyalinis, 10–15x3.5–4 μ.

SEMERARA, in foliis *Canarii luzonici*, *Merrill 4138*, Julio, 1905.

Phyllachora Ardisiae P. Henn. sp. nov.

Maculis fuscis, rotundatis vel confluentibus effusis; stromatibus epiphyllis, rotundato- vel oblongo-pulvinatis, atris, subnitentibus, loculis immersis numerosis vix ostiolatis; ascis clavatis, obtusis, paraphysatis, 8-sporis, 65–80x8–10 μ; sporis oblongis obtusis, nubilosis, hyalinis, 8–12x5–6 μ.

LUZON, Prov. Benguet, Daklan ad Kabayan in foliis *Ardisiae Candolleanae*, *Merrill 4940*, Oct.-Nov., 1905.

Phyllachora Macarangae P. Henn. sp. nov.

Maculis angulato-rotundatis vel effusis, fuscis; stromatibus epiphyllis gregariis rotundato- vel oblongo-angulatis, pulvinatis, atro-subnitentibus; loculis immersis, subglobosis, ostiolis subpunctiformibus; ascis clavatis, vertice obtusis, 8-sporis, 50–70x10–14 μ, paraphysibus filiformibus, hyalinis, guttulatis, 2 μ crassis; sporis oblique monostichis vel distichis, oblongis, obtusis, hyalinis, 10–15x5–6 μ.

BALUT, in foliis *Macarangae* sp., *Merrill 5424*, Oct., 1906.

Phyllachora Pongamiae P. Henn. sp. nov.

Maculis minutis fuscidulis; stromatibus amphididymis sparsis, rotundatis, planis, atro-subnitentibus, 1–2 mm diam.; loculis immersis numerosis, ostiolis subverrucoso-prominulis; ascis clavatis, obtusis, 8-sporis, paraphysatis, 60–70x8–10 μ; sporis oblique monostichis interdum subdistichis, oblongis vel ovoideis, 10–13x3.5–4 μ, hyalinis.

MINDANAO, *Davao*, in foliis *Pongamiae glabrae*, *Copeland 563*, Mart., 1904.

Phyllachora luzonensis P. Henn. sp. nov.

Maculis effusis, fuscidulis, stromatibus amphididymis, angulato-rotundatis, sparsis vel gregarie confluentibus, planis, atris; loculis immersis, numerosis, ostiolis hypophyllis, verrucoso-prominulis; ascis clavatis, vertice obtusis, paraphysatis, 8-sporis, 60–80x5–6 μ; sporis ellipsoideis interdum ovoideis, hyalinis, 8–11x3.5–4 μ.

LUZON, Prov. Cavite, Maragondong, in foliis *Millettiae Merrillii*, *Merrill 4173*, Julio, 1905.

Phyllachora Parkiae P. Henn. sp. nov.

Maculis rotundatis vel effusis, flavo-fuscidulis; stromatibus epiphyllis sparse gregariis interdum confluentibus, minutis, pulvinatis, atro-nitentibus; loculis paucis, immersis, globosis; ascis clavatis, apice obtuso-rotundatis, paraphysatis, 8-sporis, 45–70x8–12 μ; sporis ellipsoideis, obtusis, oblique monostichis vel subdistichis, 2-guttulatis, hyalinis, 7–10x5–6 μ.

LUZON, Prov. Bataan, Lamao, et Prov. Rizal, Montalban, in foliis *Parkiae Roxburghii*, *Copeland 27*; *Merrill 5097*, Jan., 1904, Mart., 1906.

AUERSWALDIA Sacc.

Auerswaldia Merrillii P. Henn. sp. nov.

Maculis effusis fuscidulis, stromatibus amphididymis, sparse gregariis, rotundatis, atro-nitentibus, planiusculis, ca. 1–1.5 mm diam.; loculis immersis, subglobosis; ascis clavatis, obtusis, paraphysatis, 8-sporis, 140–180x10–13 µ; sporis longe fusoideis, utrimque subacutis vel subpapillato-hyalinis, guttulatis, subfuligineis, 30–12x8–10 µ.

MINDORO, monte Halcon, in foliis *Freycinetiae* sp., *Merrill 5526*, Nov., 1906.

Auerswaldia Arengae Racib. Paras. Alg. et Pilze Java, 3: 27.

MINDORO, flumine Bongabon, in foliis *Caryotae* sp., *Whitford 1373*^{a}, Jan., 1906.

Auerswaldia Derridis P. Henn. sp. nov.

Maculis rotundatis vel effusis, brunneis, stromatibus amphididymis, gregariis, saepe confluentibus, rotundatis, planis, atris, opacis; loculis immersis, subglobosis; ascis cylindraceis, obtusis, 8-sporis, p. spor. 30–35x5 µ; sporis oblique monostichis, ellipsoideis flavido-olivascentibus, 5–6x4–4.5 µ.

MINDORO, flumine Alag, in foliis *Derridis* sp., *Merrill 5544*, Nov., 1906.

SCIRRHIA Nitch.

Scirrhia luzonensis P. Henn. sp. nov.

Maculis oblongis vel striiformibus, fuscis; stromatibus epiphyllis sparsis, oblongis, erumpentibus, fusco-atris, 0.5–1 mm longis, loculis seriatis ostiolatis; ascis clavatis, obtusis, 8-sporis, 60–80x7–9 µ; sporis subdistichis oblonge fusoideis, utrimque acutis, vel rostellatis, hyalinis, medio 1-septatis, 20–30x3–3.5 µ.

LUZON, Prov. Laguna, Los Baños, in foliis bambusae, *Merrill 5122:* Prov. Bataan, Lamao, *Copeland 282.*

ROUMEGUERIA Sacc.

Roumegueria Ichnanthi P. Henn. sp. nov.

Maculis fuscidulis, striiformibus; stromatibus amphididymis, minutis, rotundatis, striiforme confluentibus, atris, paucilocularibus; ascis clavatis vel fusoideis, obtusis vel acutiusculis, saepe curvulis, 8-sporis, 45–60x5–7 µ; sporis subdistichis, fusoideis, utrimque subacutis, saepe curvulis, hyalinis, 4- vel 5-septatis, 15–20x3.5–4 µ.

MINDORO, monte Halcon, in foliis *Ichnanthi pallentis*, *Merrill 5533*, Nov., 1906.

OPHIODOTHIS Sacc.

Ophiodothis cfr. **vorax** (Berk. et Cooke) Sacc. Syll. 2: 652.

LUZON, Prov. Benguet, in culmis graminis, *Elmer 6373*, Maio, 1904.

SPHAERIACEÆ.

ROSELLINIA De Not.

Rosellinia Cocoes P. Henn. sp. nov.

Peritheciis gregariis, superficialibus, hemisphaericis vel subglobosis. atro-carbonaceis, pruinosis, subangulosis, ad ostiolum papillatum sublaevibus, ca. 0.7–1 mm diam.; ascis cylindraceo-clavatis, obtusis, 8-sporis, paraphysatis, 90–100x7–8 μ; sporis oblique monostichis, ellipsoideis, inaequilateralibus, obtusiusculis vel acutiusculis, atris, 13–16x6–8 μ.

MINDANAO, Davao, in pedunculis emortuis *Cocoes nuciferae*, *Copeland 456*, Mart., 1904.

Rosellinia Bambusae P. Henn. *sp. nov.*

Peritheciis culmicolis, gregariis superficialibus, subhemisphaericis, atro-carbonaceis, rugulosis, papillato-ostiolatis, ca. 0.5–1 mm diam.; ascis cylindraceis, 8-sporis, plerumque secedentibus; sporis oblique monostichis, oblongis, obtusis, atro-brunneis, 8–11x3–3.5 μ.

LUZON, Prov. Pampanga, monte Arayat, in ramis emortuis bambusae, *Merrill 5030*, Feb., 1906. *R. geasteroidi* Ell. et Ev. diversa.

CLYPEOSPHAERIACEÆ.

APIOSPORA Sacc.

Apiospora luzonensis P. Henn. sp. nov.

Peritheciis gregariis, parallele seriatis, immersis culmique superficiem elevantibus erumpentibusque, subglobosis, atris, ca. 200 μ diam.; ascis clavatis, obtuse rotundatis, 8-sporis, 90–100x20–24 μ; sporis subdistichis, oblonge clavatis, incurvo-attenuatis, 20–24x8–10 μ, hyalinis, tunicatis, prope basim 1-septatis subconstrictis.

LUZON, Prov. Bataan, in culmis emortuis bambusae, *Merrill 3533*, Oct., 1906. *Eutypae bambusinae* Penz. et Sacc. simillima.

PLEOSPORACEÆ.

PHYSALOSPORA Niessl.

Physalospora Ramosii P. Henn. sp. nov.

Maculis flavidulis vel obsoletis, sparsis; peritheciis epiphyllis gregariis, erumpentibus, pulvinatis, atris, opacis; ascis clavatis, obtusis, paraphysatis, 8-sporis, 40–50x8–12 μ; sporis oblique monostichis vel subdistichis, subglobosis vel ovoideis, hyalinis, intus granulatis, 6–8x5–7 μ.

LUZON, Prov. Rizal, in foliis *Derridis*, *Bur. Sci.* sp. no. 1396, *Bur. Sci. 1396a Ramos*, Aug., 1906.

OPHIOBOLUS Riess.

Ophiobolus Nipae P. Henn. sp. nov.

Peritheciis gregariis innato-erumpentibus, rotundato-depressis, atris, ostiolo conoideo, 0.5–0.6 mm diam.; ascis cylindraceo-clavatis, vertice obtuso-rotundatis, curvulis, 8-sporis, 100–120x10–13 μ; sporis filiformibus, parallelis, utrimque obtusis, curvulis, pluriseptatis, 80–100x-2.5–3.5 μ, hyalinis.

LUZON, Prov. Pampanga, San Esteban, in petiolis emortuis *Nipae fruticantis*, *Merrill 4257*, Sept., 1905.

Ophiobolus Livistonae P. Henn. sp. nov.

Peritheciis gregariis innato-erumpentibus, superficialibus, rotundato-depressis, atris, conico-ostiolatis, 0.4–0.5 mm diam.; ascis cylindraceo-fusoideis, obtusiusculis, paraphysatis, 8-sporis, 80–110x5–8 μ; sporis parallelis, filiformibus, obtusis, pluriseptatis, hyalinis, 70–80x2 μ.

MINDANAO, Davao, in petiolis emortuis *Livistonae*. *Copeland 524*, Mart., 1904.

CUCUBITARIACEÆ.

GIBBERIDEA Fckl.

Gibberidea Nipae P. Henn. sp. nov.

Peritheciis superficialibus, liberis, caespitosis, in stromate atro-crustaceo effuso dispositis, atro-carbonaceis, ovoideis, conico-ostiolatis deinde perforatis, ascis clavatis, vertice obtuso-rotundatis, 8-sporis, 90–110x20 μ; sporis subdistichis, oblonge fusoideis, utrimque obtusiusculis, 4- vel 5-septatis, brunneis, 40–48x8–10 μ.

LUZON, Prov. Pampanga, San Esteban, in petiolis emortuis *Nipae fruticantis*, *Merrill 4255*, Sept., 1905.

AMPHISPHAERIACEÆ.

JULELLA H. Fab.

Julella luzonensis P. Henn. sp. nov.

Peritheciis gregariis, corticí nidulantibus, simplicibus, globuloso-depressis, atro-carbonaceis, papillatis, vertice poro pallido perforatis, 1–1.5 mm diam.; ascis clavatis, ca. 40 μ crassis, 2- raro 4-sporis; paraphysibus copiosis, filiformibus, ca. 2 μ crassis; sporis monostichis, cylindraceis vel fusoideis, utrimque obtuso-rotundatis, 12–16-septatis, clathrato-reticulatis, atro-brunneis, 80–120x20–23 μ.

LUZON, Prov. Benguet, in cortice arboris, *Elmer 5937*, Mart., 1904.

VALSACEÆ.

EUTYPA Tul.

Eutypa bambusina Penz. et Sacc.

LUZON, Prov. Bataan et Prov. Rizal in culmis emortuis bambusae, *Copeland 150.* CULION, *Merrill 3606.* Ascis 20–30x4–5 μ.

Eutypa flavo-virens (Hoffm.) Tul. Sel. Fung. Carp. 2: 57.

LUZON, Prov. Rizal, Montalban, in ramis dejectis, *Merrill 5098,* Mart., 1906.

ENDOXYLA Fckl.

Endoxyla Mangiferae P. Henn. sp. nov.

Stromatibus ligno innatis, peritheciis gregariis immersis, atris, ostiolis subulatis superantibus; ascis stipitatis, clavatis, 8-sporis, ca. 30x6 μ; sporis subdistichis cylindraceis, curvatis, fuscidulis, 6–7x2 μ.

MINDANAO, Davao, in ligno emortuo *Mangiferae indicae, Copeland 825,* Apr., 1904.

DIATRYPEACEÆ.

DIATRYPE Fries.

Diatrype mindanaensis P. Henn. sp. nov.

Stromatibus innato-erumpentibus, dein superficialibus, gregariis, pulvinatis vel orbiculare disciformibus, atro-carbonaceis, rugulosis, 1–1.5 mm diam.; loculis immersis, numerosis, globulosis; ascis stipitatis, clavatis, 8-sporis; sporis subdistichis, cylindraceis, curvulis, fuscidulis, 6–7x2 μ.

MINDANAO, Prov. Zamboanga, San Ramon, in arboris ramulis siccis, *Copeland 744,* Maio, 1904. *Diatrypi disciformi* affinis.

XYLARIACEÆ.

USTULINA Tul.

Ustulina maxima (Web.) Schröt.

LUZON, Prov. Rizal ad truncum emortuum *Fici, Bur. Sci. 56 Foxworthy:* Prov. Benguet, *Elmer 6153,* Apr., 1904.

NUMMULARIA Tul.

Nummularia philippinensis Ricker.

LUZON, Prov. Bataan, Lamao, in ligno emortuo, *Merrill 3537,* Oct., 1903.

Sporae oblongae naviculares atrae, 20–24x10–11 μ.

Nummularia placentiformis (B. & C.) Sacc. Syll. 1: 399.

MINDANAO, Prov. Zamboanga, San Ramon, in ramis putridis, *Copeland 745,* Maio, 1904.

DALDINIA De Not.

Daldinia concentrica (Bolt.) Ces. et De Not.

LUZON, Prov. Benguet, Pauai, in ramis emortuis *Quercus* sp., *Merrill 4990; Copeland 36.*

Daldinia asphalatum (Link et Fries) Sacc. Syll. 1: 394.

LUZON, Prov. Bataan, Lamao, in ligno emortuo, *Copeland 156*, Feb., 1904.

HYPOXYLON Bull.

Hypoxylon marginatum (Schwein.) Berk. Cub. Fung. no. 830.

CULION, in ramis dejectis, *Merrill 3604*. LUZON, Prov. Pampanga, monte Arayat; Prov. Bataan, monte Mariveles, in ramis putridis, *Merrill 3700, 5020*. MINDANAO, Davao, in ramis putridis, *Copeland 384*.

Hypoxylon serpens (Pers.) Fries, Sum. Veg. Sc. 387.

MINDANAO, Prov. Zamboanga, San Ramon, in ramis putridis, *Copeland 746*, Maio, 1904.

Hypoxylon annulatum (Schwein.) Mont. Syll. Crypt. 213.

LUZON, Prov. Bataan, Lamao, in cortice *Dipterocarpi*, *Copeland 161*, Feb., 1904.

Hypoxylon cfr. **multiforme** Fries, Sum. Veg. Sc. 384.

LUZON, Prov. Bataan, monte Mariveles, in ramis siccis ca. 200 m. s. m., *Copeland 154*, Jan., 1904.

Hypoxylon Hibisci P. Henn. sp. nov.

Stromatibus subgregarie erumpentibus, superficialibus, hemisphaerico-pulvinatis vel subglobosis 0.5–1 cm diam., rufo-brunneis, dein fuscis, opacis, vix ostiolatis rugulosis, intus fuscis; peritheciis immersis, globulosis; ascis cylindraceo-clavatis, pedicellatis, 8-sporis, paraphysatis; sporis oblique monostichis, ellipsoideis, obtusis, atris, 6–10x3.5–4 μ.

LUZON, Manila, in ramis siccis *Hibisci rosae-sinensis*, *Merrill 4115*, Julio, 1905.

Hypoxylon nucigenum P. Henn. sp. nov.

Stromatibus subgloboso-depressis, cinereo-fuscis vel nigricantibus, superficie subareolatis, conico-ostiolatis, intus pallidis dein atro-fuscis, ca. 2–2.5 cm diam.; peritheciis angulato-ellipsoideis, lignosis, cinereo-fuscis, 5–7 mm diam. (nuci *Pini Cembrae* similibus); ascis cylindraceis, 8-sporis, plerumque accedentibus; sporis oblique monostichis, oblonge navicularibus, utrimque obtuso-rotundatis, atris, 40–52x10–13 μ.

LUZON, Prov. Bataan, Lamao, in truncis emortuis, *Copeland 155*, Jan., 1904. PALAWAN, Ewiig River, in truncis emortuis, *Merrill 3583*, Feb., 1903. *Hypoxylon areolato* B. et C. affinis.

Hypoxylon apoense P. Henn. sp. nov.

Stromatibus hemisphaericis atris, intus pallidis, rugulosis, opacis, ostiolis prominulis, 1.5–2.5 cm diam.; peritheciis immersis, globulosis, 0.5–0.8 mm diam.; ascis pedicellatis, cylindraceis, obtusis, p. sporif. ca. 140–160x12–14 μ, 8-sporis, paraphysatis; sporis oblique monostichis, oblonge navicularibus, obtusis vel acutiusculis, 25–32x8–12 μ, atris.

MINDANAO, Davao, monte Apo, 1,800 m. s. m. in truncis emortuis, *Copeland 1073*, Apr., 1904.

XYLARIA Hill.

Xylaria Copelandii P. Henn. sp. nov.

Stromatibus dense caespitosis, ovoideis, breviter stipitatis, rugulosis, pruinosis vel cinereo-pilosulis, atris, apice longe rostratis, ca. 1 mm diam., saepe longitudinaliter sulcatis, paucilocularibus; ascis cylindraceo-clavatis, pedicellatis, p. sporif. 80–90 μ, 8-sporis, paraphysatis; sporis oblique monostichis, navicularibus, obtusiusculis, atris, 15–16x6–7 μ.

Luzon, Prov. Bataan, Lamao, in truncis *Calami* sp., *Copeland 198*, Feb., 1904.

Xylaria bataanensis P. Henn. sp. nov.

Stromatibus cylindraceo-fusiformibus, stipitatis, caespitosis vel singularibus, clavula usque ad 2.5 cm longa, 1.5–3 mm crassa, apiculata vel rostrata, striatula, ostiolis prominulis; stipite tereti aequali, usque ad 1 cm longo, 0.5–1 mm lato; ascis pedicellatis, ca. 70–100x5–6.5 μ, 8-sporis, paraphysatis; sporis oblique monostichis, navicularibus, atris, obtusis, 10–14x4–5.5 μ.

Luzon, Prov. Bataan, Lamao, in ligno putrido, *Merrill 3530; Copeland 162*, Feb., 1904, Oct., 1905.

Xylaria cfr. **corniformis** Fries, Sum. Veg. Sc. 381.

Luzon, Prov. Rizal, Bosoboso, in trunco *Shoreae*, *Bur. Sci. 1205 Ramos*, Julio, 1906.

KRETZCHMARIA Fries.

Kretzchmaria microspora P. Henn. Fung. Amaz. 2: 261.

Mindanao, Davao, in trunco emortuo, *Copeland 496*, Mart., 1904.

MICROTHYRIACEÆ.

ASTERINA Lév.

Asterina Derridis P. Henn. sp. nov.

Peritheciis hypophyllis gregariis in maculis atris effusis, dimidiato-scutellatis, radiato-cellulosis, brunneis, poro pertusis, 70–90 μ, hyphis radiatis, ramosis, septatis, fusco-brunneis, 3–3.5 μ circumdatis; ascis ellipsoideis vel ovoideis, vertice tunicatis, 8-sporis, 20–30x20–25 μ; sporis conglobatis ovoideis vel ellipsoideis, 1-septatis, constrictis, hyalinis deinde fuscidulis granulatis, 11–16x6–8 μ.

Mindanao, Davao, in foliis *Derridis uliginosae*, *Copeland 353*, Mart., 1904.

MICROPELTIS Mont.

Micropeltis bambusicola P. Henn. in Engl. Bot. Jahrb. (1900) 273.

Mindanao, Prov. Davao, Todaya, 1,000 m. s. m. in ramulis bambusae, *Copeland 1229*, Apr., 1904.

HYSTERIACEÆ.

SCHIZOTHYRIUM Desm.

Schizothyrium Aceris (P. Henn. et Lind.) Pat.

Mindoro, monte Halcon, in foliis *Aceris philippini* Merr., *Merrill 5537*, Nov., 1906.

LEMBOSIA Lév.

Lembosia Javanica (Pat.) Racib. Paras. Alg. Pilze Jav. **2:** 20.

LUZON, Prov. Pampanga, San Esteban, in foliis *Nipae fruticantis*, *Merrill 4248*, Sept., 1905.

Lembosia Dipterocarpi P. Henn. sp. nov.

Maculis mycelii epiphyllis, rotundatis, atro-crustaceis, sparse gregariis, ca. 2 mm diam.; peritheciis gregariis, linearibus, flexuosis, atris, saepe anastomosantibus vel ramosis, longitudinaliter rimoso-dehiscentibus; ascis ovoideis vel ellipsoideis, 40–50x30–40 μ, 8-sporis, obtusis; sporis conglobatis, ellipsoideis vel ovoideis, medio 1-septatis, constrictis, intus granulatis, atris, 20–30x16–20 μ.

LUZON, Prov. Bataan, Lamao, in foliis *Dipterocarpi grandiflori*, *Copeland 280*, Jan., 1904.

PARMULARIA Lév.

Parmularia Hymenolepidis P. Henn. sp. nov.

Stromatibus hypophyllis, sparsis, crustaceo-membranaceis, atris, dimidiato-scutellatis, 5–6 mm diam., loculis radiato-plicatis, ramosis, longitudinaliter rimoso-dehiscentibus; ascis clavatis, obtusis, 8-sporis, 28–35x6–7 μ, paraphysibus copiosis superantibus, apice conglutinatis, clavatis, flavo-brunneis; sporis subdistichis, oblonge ovoideis, 2-guttulatis, medio 1-septatis, flavo-fuscidulis, 10x3–3.5 μ.

MINDANAO, monte Apo, 1,800 m. s. m. in foliis *Hymenolepidis spicatae*, *Copeland 1080*, Apr., 1904. *Parmulariae discoideae* Rac. affinis sed distincta.

HYSTERIUM Tode.

Hysterium Hoyae P. Henn. sp. nov.

Peritheciis amphigenis sparse gregariis, oblongis, rectis vel curvatis, utrinque obtusis, atris, longitudinaliter rimoso-dehiscentibus, 180–220x80–100 μ; ascis oblongis vel clavatis, 8-sporis, 24–26x10–15 μ; sporis subtristichis vel conglobatis, fusoideis vel clavatis, 3-septatis, fuscis, 10–17x3–3.5 μ.

MINDANAO, Davao, in foliis *Hoyae* sp., *Copeland 628*, Mart., 1904.

TRYBLIDIELLA Sacc.

Tryblidiella mindanaensis P. Henn. sp. nov.

Peritheciis erumpentibus, caespitosis, subcoriaceis, oblongis, rectis vel curvulis, atris, labris tumidis laevibus, ca. 1–2.5 mm longis, 0.3 mm latis; disco atrofusco laevi; ascis subclavatis, obtusis, 8-sporis, p. sporif. 140–160x17 μ, paraphysibus obvallatis hyalinis; sporis oblongis, subcurvulis, utrinque obtusis, 3-septatis, atro-brunneis vel castaneis, oblique monostichis, 20–30x10–12 μ.

MINDANAO, Prov. Zamboanga, San Ramon in arboris cortice, *Copeland 720*, Maio, 1904.

MERRILLIOPELTIS P. Henn. gen. nov.

Perithecia subinnato-superficialia, orbiculari-scutata, longitudinaliter rima angustissima dehiscentia, cornea; asci cylindracei, octospori, paraphysati; sporae longe fusoideae, 3-pluriseptatae, hyalinae.

Merrilliopeltis Calami P. Henn. sp. nov.

Peritheciis innato-superficialibus, dense gregariis, orbiculari- vel ellipsoideo-scutatis, cocciformibus, brunneis, ca. 1.5 mm longis, 1 mm latis, longitudinaliter rima angustissima dehiscentibus, contextu corneo, brunneo vel fusco; ascis cylindraceis, vertice obtuso-rotundatis, 240–260x 6–7 µ, 8-sporis, paraphysatis; sporis longe fusoideis, utrimque acutis, hyalinis, primo medio 1-septatis deinde 3-pluriseptatis subconstrictis, 50–75x4–5 µ.

Mindoro, monte Halcon, in truncis *Calami* sp., *Merrill 6113*, Nov., 1906.

PHACIDIACEÆ.

RHYTISMA Fries.

Rhytisma ? Viburni P. Henn. sp. nov.

Stromatibus amphididymis, atris, bullatis, rotundatis, immaturis.

Luzon, Prov. Benguet, Monte Tonglon, *Merrill 4986*, Nov., 1905.

Rhytisma ? Lagerstroemiae P. Henn. sp. nov.

Stromatibus innatis rotundatis, vel effusis epiphyllis, atris, rimosis, immaturis.

Luzon, Prov. Bataan, Lamao, in foliis *Lagerstroemiae speciosae*, *Copeland 281*, Jan., 1904.

PATELLARIACEÆ.

LEPTOPEZIZA Rostr.

Leptopeziza mindanaensis P. Henn. sp. nov.

Ascomatibus superficialibus singularibus, rotundato-discoideis, marginatis, atris, 1.5–2 mm diam.; disco laevi, atro; ascis fusoideo-clavatis, apice attenuatis, obtuso-rotundatis, 130–150x20–30 µ, 8-sporis, paraphysibus superantibus, ramosis, septatis, hyalinis, ca. 2 µ crassis, apice coalitis, fuscidulis; sporis subdistichis, oblongo-fusoideis, utrimque acutis vel obtusiusculis, 5–7-septatis, fuscis, 50–60x10–12 µ.

Mindanao*, Prov. *Davao*, monte *Apo*, *in ramorum emortuorum cortice*, *Copeland 1100, Apr. 1904.

HELOTIACEÆ.

PILOCRATERA P. Henn.

Pilocratera celebica P. Henn. in Monsunia 33, *t. 1*, *f. 19*.

Mindoro, flumine Bongabon in ligno putrido, *Whitford 1418*, Feb., 1906.

SPHAEROPSIDACEAE.

PHYLLOSTICTA Pers.

Phyllosticta Acoridii P. Henn. sp. nov.

Maculis amphigenis, rotundatis, incrassatis, rufo-brunneis vel hyalinis exaridis atro-cingulatis; peritheciis singularibus (rarissimis) lenticularibus, atris, ca. 50 μ, conidiis oblongo-cylindraceis, obtusis, hyalinis, 4–5x0.8 μ.

MINDANAO, monte Malindang, in foliis *Acoridii*, *For. Bur. 4598 Mearns et Hutchinson*, Maio, 1906.

PLACOSPHAERIA Sacc.

Placosphaeria Merrillii P. Henn. sp. nov.

Maculis rotundatis vel effusis, flavo-fuscidulis; stromatibus amphididymis, gregariis, saepe confluentibus, angulato-rotundatis, planiusculis, atris, loculis immersis, conidiis bacillaribus, hyalinis, 5–6x0.5 μ.

PALMAS, in foliis *Derridis*, *Merrill 5331*, Oct., 1906.

Placosphaeria Tiglii P. Henn. sp. nov.

Maculis amphididymis, rotundatis, bullatis, fuscis; stromatibus fuscis, rotundatis, rugulosis; conidiis bacillaribus hyalinis, 4–5x0.5 μ.

BALABAC, in foliis *Crotonis Tiglii*, *Bur. Sci. 518 Mangubat*, Mart., 1906.

SPHAEROPSIS Lév.

Sphaeropsis Pandani P. Henn. sp. nov.

Peritheciis innato-erumpentibus, sparse gregariis, rotundato-hemisphaericis vel lenticularibus, atro-nitentibus, apice papillato-perforatis, usque ad 1 mm diam.; conidiis oblonge ellipsoideis, utrinque obtusis, luteo-brunneis 20–26x8–11 μ.

MINDANAO, Davao, in foliis siccis *Pandani* sp., *Copeland 592*, Mart., 1904.

CONIOTHYRIUM Corda.

Coniothyrium Oroxyli P. Henn. sp. nov.

Maculis effusis, pallidis vel fuscis, peritheciis sparse gregariis, innato-erumpentibus, ellipsoideis vel globulosis, atris, cellulosis, ca. 160–180x130–150 μ; conidiis ellipsoideis vel subglobosis 1-guttulatis, atro-fuscis, 4x2 μ.

MINDANAO, Davao, in capsulis putridis *Oroxyli indici*, *Copeland 886*, Apr., 1904.

Coniothyrium Gmelinae P. Henn. sp. nov.

Peritheciis subepidermide erumpentibus, subglobosis, atris; conidiis ellipsoideis, atro-castaneis, 4–5x4 μ.

MINDANAO, Davao, in ramis siccis *Gmelinae villosae* in societate *Diplodiae Gmelinae*, *Copeland 512*, Mart., 1904.

Coniothyrium Coffeae P. Henn. sp. nov.

Peritheciis gregariis innato-erumpentibus, minutis, atris, globulosis, perforatis, ca. 120–150 μ; conidiis oblongis, utrimque obtusis, 1–2-guttulatis, brunneo-fuscis, 5–6x2–2.5 μ.

Luzon, Prov. Benguet, Kabayan, in ramulis siccis *Coffeae arabicae*, *Merrill 4907*, Oct.-Nov., 1905.

DIPLODIA Fries.

Diplodia Gmelinae P. Henn. sp. nov.

Peritheciis innato-erumpentibus, caespitosis, atris, hemisphaericis; conidiis ellipsoideis vel ovoideis, obtuso-rotundatis, intus granulatis, atro-castaneis; 18–24x10–13 μ.

Mindanao, Davao, in ramulis siccis *Gmelinae villosae*, in societate *Coniothyrii Gmelinae* P. Henn., *Copeland 512*, Mart., 1904.

Diplodia Hibisci P. Henn. sp. nov.

Peritheciis erumpentibus, atro-carbonaceis, pulvinatis; conidiis ellipsoideis vel ovoideis, atris, 1-septatis, haud constrictis, 16–22x8–12 μ.

Luzon, Manila, in truncis emortuis *Hibisci rosae-sinensis*, in societate *Megalonectriae pseudotrichiae*, *Merrill 4116*, *Julio*, 1905.

Diplodia Fructus-Pandani P. Henn. sp. nov.

Peritheciis erumpento-superficialibus, caespitosis, interdum confluentibus, minutis, pulvinatis, atro-carbonaceis, poro pertusis, rugulosis; conidiis ellipsoideis vel ovoideis, primo hyalinis, continuis nubilosis dein *medio septatis*, *atro-fuligineis*, 18–22x9–11 μ; *conidiophoris* teretibus, hyalinis, 6–8x3 μ.

Luzon, Prov. Bataan, Lamao, in squamis fructus *Pandani luzonensis*, *Merrill "B"*, Jan., 1904.

SEPTORIA Fries.

Septoria ? Molleriana Bres. Rev. Myc. (1891) 68.

Luzon, Prov. Zambales, in foliis *Canavaliae obtusifoliae*, *Merrill 3609*, Junio, 1903.

NECTRIOIDEACEÆ.

ASCHERSONIA Mont.

Aschersonia sp.

Mindoro, monte Halcon, in foliis filicis (immatura), *Merrill 3178*, Nov., 1906.

MELANCONIACEÆ.

PESTALOZZIA De Not.

Pestalozzia Palmarum Cooke, Grev. *t. 86*, *f. 3*.

Mindanao, Davao, in foliis emortuis *Cocois nuciferae*, *Copeland 337*, Mart., 1904.

MUCEDINACEÆ.

ASPERGILLUS (L.) Link.

Aspergillus Delacroixii S. et S.

LUZON, Prov. Batangas, Lipa, in fructibus *Theobromae cacao*, *Merrill 3613*, Aug., 1902.

Aspergillus flavus (De Bary) Bref. Rab. Fung. Eur. no. 2135.

MINDANAO, Davao, in foliis *Morindae bracteatae*, *Copeland 547*, Mart., 1904.

DEMATIACEÆ.

CONIOSPORIUM Link.

Coniosporium circumscissum (B. et Br.) Sacc. Syll. 4: 244.

PANAY, Iloilo, *Copeland 47*. LUZON, Prov. Bataan, monte Mariveles, in ramis bambusae, *Merrill 3699*.

RAMULARIA Unger.

Ramularia Catappae Racib. Paras. Alg. Pilz. Java, 2 (1900) 41.

LUZON, Manila, in foliis *Terminaliae Catappae*, *Merrill 3610*, Julio, 1902.

HELMINTHOSPORIUM Link.

Helminthosporium Ravenelii Curt. et Berk.

LUZON, Prov. Benguet, in paniculis *Sporoboli* sp., *Elmer 5943*; *Merrill 4912*.

BRACHYSPORIUM Corda.

Brachysporium Pini-insularis P. Henn. sp. nov.

Caespitibus gregarie sparsis vel effusis, minutis, atris, hyphis fasciculatis, septatis, fuscis, 2-3 μ latis; conidiis ellipsoideis, 2-septatis, atrofuscis, 10–12x6–7 μ.

LUZON, Prov. Benguet, Baguio, in foliis *Pini insularis*, *Merrill 4881*, Oct., 1905.

CERCOSPORA Fres.

Cercospora Amorphophalli P. Henn. in Hedw. (1902) 147.

SIASSI, in foliis *Amorphophalli campanulati*, *Merrill 5310*, Oct., 1906.

Cercospora occidentalis Cooke in Hedw. (1878) 30.

LUZON, Prov. Nueva Ecija, in foliis *Cassiae occidentalis*, *Merrill 4196*, Sept., 1905.

Cercospora Helminthostachydis P. Henn. sp. nov.

Maculis fuscidulis exaridis, sparsis, rotundatis; caespitulis hypophyllis atrofuscis, hyphis fasciculatis, fuscis, septatis, ca. 25–50x3–4 μ; conidiis fusoideis, fuscidulis, 3–7-septatis, 40–60x3–4 μ.

MINDANAO, Davao, in foliis *Helminthostachydis zeylanicae*, *Copeland 543*, Mart., 1904.

Cercospora Tiglii P. Henn. sp. nov.

Maculis sparse gregariis, rotundatis, subbullatis, atris; hyphis fasciculatis, fuscidulis, septatis, ca. 70–4 μ; conidiis cylindraceo-fusoideis vel clavatis, fuscidulis, 40–50x3.5 μ, 4- vel 5-septatis.

BALUT, in foliis *Crotonis Tiglii*, *Merrill 5423*, Oct., 1906.

STILBACEÆ.

SPOROCYBE Fries.

Sporocybe philippinensis P. Henn. sp. nov.

Caespitulis dense gregariis, villosis, atro-fuscis, effusis; stipitibus erectis, rigidis, atris, 200–250 μ longis, fusco-tomentosis, apice capitellatis; capitulis subglobosis vel ovoideis, atris, 200–220 μ diam.; conidiis ellipsoideis vel ovoideis, fuscis, 8–13x5–6 μ.

SAMÁR, (*Cajoagan*) *in ligno*, *Merrill 5241*, Oct., 1906.

THE PHILIPPINE SPECIES OF PANDANUS.

By Count Ugolino Martelli.
(*Florence, Italy.*)

Father Manuel Blanco, in the first edition of his "Flora de Filipinas" (1837), describes only five species of *Pandanus*, *P. spiralis*, *P. gracilis*, *P. exaltatus*, *P. Sabotan*, and *P. radicans*; and in the second edition (1845) he adds two others, *P. malatensis* and *P. inermis*. No further contribution to the genus appeared in the edition of 1879, published by Naves and Fernandez-Villar.[1]

Vidal in his "Flora forestal de Filipinas, Sinopsis de familias y generos" (atlas) (1883) *tab. 95*, represented as *Pandanus odoratissimus* L. (= *P. tectorius* Sol.) a quite different species, which I have named *Pandanus Vidalii*. Another *Pandanus* mentioned by Vidal in his "Revision de Plantas vasculares de Filipinas" (1886), 280, *Vidal 1940*, collected at "S. Mateo, Provincia de Manila," I have not been able to identify. Warburg[2] in his recent monograph of the family credits to the Archipelago but one definitely known species of the genus, *P. tectorius* Sol., reducing to it *P. spiralis* Blanco, and considering Blanco's other species as doubtful or imperfectly known. These were the few species of *Pandanus* known from the Philippines up to the year 1904, and from the above enumeration one might suppose that the genus was not richly represented in the Archipelago. However in 1902 botanical investigations were commenced under the auspices of the American Government, and since that time very many new plants have been discovered, among them a considerable number of previously described *Pandanaceæ* not before known to exist in the Archipelago, and others completely new to science. Mr. A. Loher and Mr. A. D. E. Elmer have also contributed materially to our knowledge of the Philippine flora and have given especial attention to the representatives of the genus *Pandanus*. Since

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[1] In the "Novissima Appendix" to Blanco's "Flora de Filipinas," on page 284, Naves enumerates, as Philippine, seventeen species of *Pandanus*, but I am very sceptical regarding their correct determination, as well as regarding their occurrence in the Philippines. As the names of these species are not accompanied by any description, and no herbarium specimens are extant, I do not consider it worth while to consider them here.

[2] *Das Pflanzenreich* 3 (1900) 1–97.

1902, from the eight species enumerated in the works of Blanco and Vidal, those of the former very doubtful and imperfectly known, the number of species of *Pandanus* known to occur in the Philippines has been increased to twenty-three with several varieties and forms, and three doubtful species. As, in so a short time, the known number of these plants has been so appreciably multiplied, I think it probable that, even now, we know not more than one-half of the species of *Pandanus* actually growing in the Archipelago.

So far as I can judge, giving due consideration to the general geographical distribution of the plants of the Philippines, it seems to me possible that several of the species of *Pandanus* which now appear to be endemic in the Philippine Archipelago, may not really be so, but are likely to grow also in Borneo, Celebes, or in other neighboring countries, which at the present time are insufficiently explored botanically. The numerous specimens of *Pandanus* collected by recent botanists have afforded the means of identifying most of the species too briefly and obscurely described by Blanco, which otherwise would have remained unrecognizable. We are indebted especially to Mr. Merrill and Mr. Elmer, for having, in their explorations, given especial attention to the rediscovery of Blanco's species. I have also been able to identify, with the help of the recently collected material, a few specimens of Philippine *Pandanus*, from older collections which were preserved in various European herbaria without any reference to their origin or collectors.

I wish to acknowledge my especial indebtedness to Mr. E. D. Merrill, who has rendered possible this revision of Philippine *Pandanus*, by the generous loan of the entire collection of this group of plants contained in the herbarium of the Bureau of Science, and also for having presented me with a complete set of his duplicate types. I am also much obliged to Mr. A. D. E. Elmer, who has been so good as to send me his specimens and to communicate the results of his researches. The specimens cited in this paper, unless otherwise stated, are to be found in the herbarium of the Bureau of Science, and in my private herbarium.

§ KEURA.

(1) **Pandanus Linnaei** Gaud. Voy. Bonite (1841) *t. 12, f. 1–8.*

Arbuscula 2–4 m alta, basi non vel vix radicans (Merrill). Folia 1.6–1.8 m longa, 7 cm lata, basi non dilatata, apicem versus gradatim longe angusteque acuminato-attenuata, supra sublevis et nitida, subtus glauca, crebre et minutissime longitudinaliter nervosa, marginibus (ima basi excepta) crebre dentato-serratis, dentibus subulatis, longiusculis, erecto-patentibus; costa media prominenti acuta spinis parvis, subulatis, inferioribus retroflexis munita. Syncarpium solitarium, magnum, globoso-oblongum, viride, pendulum, longe et valide pedunculatum. Phalanges numerosae (55 e Merrill), 7.5 cm longae, obconicae, basi angustatae, irregulariter hexagonae, sulcato-angulosae, in vertice 5.5 cm latae, truncatae, subplanae, loculis 9–11, latis, convexis, stigmate lato, sessili vel subsessili, prominenti abrupte terminatis, sulcis interlocularibus profundis.

SEMERARA, *Merrill 4140*, July, 1905, in open grass lands along borders of thickets but near the sea.

Gaudichaud's type phalanges are preserved in the Botanical Museum at Paris, doubtfully labeled "India;" but I do not think *Pandanus Linnaei* to be at all an Indian plant, and rightly Sir Joseph Hooker, in his "Flora of British India," **6**: 408, says of it, "Nothing is known of its origin." Apparently it must be considered as a Papuan species which extends to the Philippines, because Dr. Beccari brought it from the Key Islands, and in the Kew Herbarium there is a specimen from the Aru Islands, collected by Mr. Moseley of the Challenger Expedition. I have also received the fruits of this *Pandanus*, together with other species closely allied to it, from Peru Island, one of the Gilbert Group.

Professor Warburg, in Engler's Pflanzenreich, **3**: 46, reduces *Pandanus Linnaei* Gaud. to *Pandanus tectorius* Sol., while Count Solms-Laubach in Linnaea **42** (1878) 67, only says of it: "Conferas *Pandanum fascicularem* Lin." (= *P. tectorius* Sol.); but I think it better to consider it as a distinct species.

Mr. Merrill named the above specimen from Semerara Island *Pandanus exaltatus* Blanco, but in his paper on the identification of Blanco's species[3] writes of *P. exaltatus*: "Erroneously reduced by Villar to *P. fascicularis* Linn. Blanco evidently includes two species in his description, one form growing in the mountains, the other at the seashore; the latter is certainly *Pandanus tectorius* Sol., what the former is, can not be determined from Blanco's description;" and later in a manuscript note which accompanies his herbarium specimen no. 4140, Mr. Merrill says: "From Blanco's description I am confident that he included two species in *Pandanus exaltatus*, one from the mountains and one from the seashore. The one from the mountains is undoubtedly the species I have described as *Pandanus arayatensis*, and I am confident that the present no. 4140, represents the other form; I believe it advisable to consider this form as the representative of Blanco's species."

Blanco's description, however, does not appear to me to include two species, but only one, that from Mount Tala, which, I agree with Mr. Merrill, is the same as *Pandanus arayatensis*. Blanco speaks incidentally in the note, not in the description, of another *Pandanus*, growing in Laguna, and of this he says: "Hojas * * * cocidas en agua hacen con ellas unos petates gruesos llamados *bangcoan* los Indios de Tala, asi como los de La Laguna con su *Pangdan Sabotan* que es tan semejante á este, que tal vez son una misma cosa." It does not seem to me at all probable that the species from Laguna can be the same as that of the mountains, and as Blanco does not indicate any distinctive characters for the *Pandanus* from Laguna, I do not consider that the name of *P. exaltatus* was applied by Blanco to two species. However, the *Pandanus* collected by Mr. Merrill no. 4140, Semerara Island, is certainly to be referred to *P. Linnaei*, which in my opinion is distinct from *P. tectorius* Sol., and also different from *P. exaltatus* Blanco.

(2) **Pandanus tectorius** Sol. ex Parkinson Journ. Voy. H. M. S. Endeavour (1773) 46.

This is the most diffuse and polymorphic species of the genus, and is the only one extending over both the Indo-Malayan and Polynesian regions. It is probable that its wide geographical distribution may be explained by its growing on the seashore and by the structure of its fruits, which are adapted to transportation by water and which are easily carried here and there, even to great distances, by ocean currents. In consequence of its wide distribution, a great polymorphism is to be observed in this species, the leaves varying in size, and in the shape of their marginal teeth, while the syncarps vary in color, dimensions, number and size of the phalanges, locules, etc. My extensive collection of *Pandanus* includes a great number of specimens of *Pandanus tectorius* gathered in many and widely separated places, and among them a large number of different forms are found so allied one to another, that it is impossible to separate them specifically. From the information concerning the habit of some of these forms communicated to me by the various collectors, it seems to me that this does not change a great deal in the different varieties and forms; but I have only a small amount of data on which to establish this particular fact.

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[3] *Gort. Lab. Publ.* (Manila), **27** (1905) 89.

In order to give a systematic arrangement to the numerous Philippine forms of *Pandanus tectorius*, I have considered it necessary to distinguish several primary varieties of it and with these varieties to associate some local forms.

Pandanus tectorius Sol., var. **spiralis** Martelli, var. nov.
Pandanus spiralis Blanco Fl. Filip. (1837) 777.

FORMA α. Phalanges late obpyramidatae, basi acutae, 5 cm longae, 3–3.5 cm latae, in vertice plano-convexiusculae, loculis 6–9, subplanis, latis, sulcis interlocularibus latiusculis, superficialibus.

LUZON, Province of Bataan, Lamao, *For. Bur. 92 Barnes*, November, 1903, sandy beach.

FORMA β. Phalanges ut in forma praecedenti sed in vertice convexae, loculis 12–18, minoribus, nonnihil convexis, prominentibus, sulcis interlocularibus profundis. Arbor 6 m alta et 15 cm diam.

LUZON, Province of Bataan, Lamao, *Elmer 7018*, November, 1904, seashore. Manila "caule prostrato" (in Herb. Hort. Bot. Petropolit.).

FORMA γ. Phalanges latae, conicae, a medio usque ad basin abrupte et anguste obpyramidatae, 6 cm longae, 4.5 cm latae, in vertice plano-convexiusculae, loculis 9, convexiusculis, sulcis interlocularibus superficialibus.

LUZON, Manila (in Herb. Hort. Bot. Petropolit.).

I am quite sure from the description of *Pandanus spiralis* Blanco, in so far as it concerns the syncarps and phalanges, but not the male flowers, that it is only a variety of *Pandanus tectorius* Sol. It is the most common *Pandanus* in Luzon, but it assumes different local forms; the three described above are not, however, sharply distinguished one from another.

Pandanus tectorius Sol., var. **sinensis** Warb. in Engl. Pflanzenreich 3 (1900) 48.

Pandanus tectorius Sol.; Warb. in Perk. Frag. Fl. Philip. (1904) 55.

CULION, Halsey Harbor, *Merrill 628*, December, 1902, along the seashore.

The tree is 3–6 m high and the trunk 10–15 cm in diam. (Merrill). In the leaf of Merrill's specimen no. 628 the marginal teeth are a little closer to one another and shorter than in Warburg's typical specimen of this variety, but as regards the phalanges they are quite alike. Perhaps the slight difference is due to local influences.

A leaf specimen only, bearing the no. 2700 in the Herbarium at Manila was identified by Merrill as *Pandanus Sabotan* Blanco, and of this he writes: "This is a cultivated form which I have never seen in fruit. It is perhaps a form of *P. tectorius* Sol. The native collector, Ramos, in whom I have considerable confidence, insists that this is the only species which is called '*Sabotan*,' and that it is not found in the forests but only cultivated about houses and in towns. He also says that the leaves are used by the natives for making mats, etc., which also agrees with Blanco's note." In my opinion, because of the shape, dimensions and characteristic position of the teeth, this specimen is *Pandanus tectorius* var. *sinensis* Warb.

It seems to me that *Pandanus Sabotan* Blanco is a quite different species, and I judge so from Blanco's description, where it is said that the intermediate portion of the midrib is toothless and the secondary or lateral foldings toward the apex (that is to say, on the upper surface) are toothed, so that toward the base of the leaf there are three lines of teeth, but toward the apex the lines are four. This characteristic does not exist in the leaf of the specimen no. 2700 mentioned above and I have never seen a form of *Pandanus tectorius* Sol. with the secondary folding toothed. Naves in Blanco's Fl. Filip. ed. 3, 4: 285, thought that *Pandanus Sabotan* Blanco was the same as *Pandanus dubius* Spreng. I believe this opinion also erroneous and therefore consider that *P. Sabotan* Blanco is a species not yet identified.

Pandanus tectorius Sol., var. **Douglasii** Martelli, forma **philippinensis.**

Pandanus Douglasii Gaudich. Bot. Voy. Bonite *t. 22, f. 16.*

Erecto-prostratus (Copeland). Folia 1.5 m longa, 3.5 cm lata, longe attenuato-acuminata, dentibus marginalibus basin versus approximatis, latiusculis, subulatis, erecto-patentibus, vix incurvatis; tota costa media spinis subdistantibus, subulatis armata, quarum basilaribus validiusculis, brevissimis, basi inflatis, imis tantum retroflexis. Syncarpii phalanges in parte basilari breviter (sive tantum in earum quartam inferiorem partem) connatae, caeterum liberae et divaricatae, 4–4.5 cm longae, 2–2.5 cm latae, acute angulosae, obscure pentagonae, in dimidia superiori parte subcylindraceae, caeterum basin versus attenuato-obpyramidatae, ipsa basi angusta, vertice plano; loculis parvis, 6–8, prominentibus, pyramidatis, sulcis interlocularibus profundis.

MINDANAO, District of Davao, Malalag, *Copeland 612*, 1904, common along the seashore.

Gaudichaud figured *Pandanus Douglasii* from some phalanges collected in the Hawaiian Islands during the voyage of the Bonite, and the specimens are preserved in the carpological collection of the Botanical Museum of Paris with many others of Gaudichaud's type fruits.

Prof. Warburg in Engler's Pflanzenreich, 3: 46, places *Pandanus Douglasii* among the numerous synonyms of *Pandanus tectorius* Sol., and does not consider it even as a variety, but I am of the opinion that if it is right to unite it specifically with *Pandanus tectorius* Sol., it should be distinguished as a variety. I have not yet received from the Hawaiian Islands some promised complete specimens of typical *Pandanus Douglasii*, and therefore I am not yet able to state if the leaves and whole syncarp of the Hawaiian plant exactly coincide with the corresponding parts of the Philippine form, the identification of the latter having been made by the likeness of the phalanges.

Pandanus tectorius Sol. var. **surigaensis** Martelli var. nov.

Syncarpium 16 cm longum, 13 cm latum, globoso-ellipticum. Phalanges numerosae, parvae, 4–5 cm longae, 2–2.5 cm latae, obpyramidatae, basi angustatae, acute angulosae, in syncarpio usque ad medium coalitae, caeterum divaricatae; loculis 4–9, saepissime 6–8, parvis, prominentibus, pyramidatis; sulcis interlocularibus profundis.

MINDANAO, Province of Surigao, Surigao, *Bolster 284*, March, 1906.

This is an intermediate form between the variety *sinensis* and the form of the variety *Douglasii* described above. It seems indeed to have more affinity with the latter than with the former. It is distinguished from the var. *sinensis* by its more elliptic syncarp, its longer phalanges with their pyramidal part more slender and more elongate, smaller locules which are more pyramidal and more separated from one another by deep furrows. The shape of the teeth on the margins of the leaves is almost the same, but the teeth are a little closer to one another, rather shorter and less thick. It is distinguished from the variety *Douglasii* forma *philippinensis* by having the phalanges separated from one another only in their upper half, not swollen at all in the middle, but straight and acutely obpyramidal.

(3) **Pandanus caudatus** Merrill in Govt. Lab. Publ. **29** (1906) 6.

I am doubtful, in consequence of deficient specimens, whether *Pandanus caudatus* Merrill be a distinct species, or whether it be a variety or form of the *Pandanus exaltatus* Blanco.

LUZON, Province of Benguet, Sablan, *Elmer 6143*, April, 1904.

(4) **Pandanus exaltatus** Blanco Fl. Filip. (1837) 778.

Pandanus arayatensis Merr. in Govt. Lab. Publ. **17** (1904) 5, *t. 3*.

Pandanus banahaensis Elmer Leafl. Philip. Bot. **1** (1906) 79.

Mr. Loher, some years ago, collected on Mount Arayat a *Pandanus* and sent it to Kew, under the name of *Pandanus polycephalus*. Afterwards, in 1904, Mr. Merrill ascending the same mountain found the same form and believing it to be an undescribed species, named it *Pandanus arayatensis*. As noted above under *Pandanus Linnaei*, Mr. Merrill himself later recognized in his *Pandanus arayatensis* the *Pandanus* collected by Blanco on Mount Tala and named *exaltatus* by Blanco, which name, by right of priority, I think it best to maintain. I am unable to distinguish *Pandanus banahaensis* Elmer from *Pandanus exaltatus* Blanco.

LUZON, Province of Bulacan, Mount Tala, fide Blanco: Province of Pampanga, Mount Arayat, *Merrill 3832*, May, 1904, in forests only at and near the summit of the mountain at an altitude of 878 m; *Loher 1576*, (in Herb Kew sub. *P. polycephalo*): Province of Tayabas, Mount Banajao, *Elmer 7378*, March, 1906 (*P. banahaensis* Elmer).

Pandanus exaltatus Blanco forma **Ahernianus** Martelli, forma nova.

A forma typica differt syncarpio majori, circiter 20 cm longo, 15 cm lato, phalangibus majoribus, 5.5–6 cm longis et 3–3.5 cm latis, crassioribus, apice plus minusve rotundato, summo vertice explanato, loculis minus anguste pyramidatis et minus prominentibus, sulcis interlocularibus minus profundis.

LUZON, Province of Rizal, Bosoboso, Dec. Philip. Forest Fl. *296 Ahern's collector*, February, 1905: Province of Pampanga, Mount Arayat, *Bolster 89*, May, 1905, at the base of the mountain along a small stream.

The differences between this form and the type are to be found in the phalanges, which are longer, flatter, and sometimes more swollen in the middle. The top of the phalanges is quite level and with a rather rounded margin. The number of the pyramidal locules is variable: in the specimens collected by Mr. Bolster the furrows between the locules are not so deep as in the type. In forma *Ahernianus* the phalanges in the syncarp are free one from another in their upper half or a little less than half. The leaves do not seem to be different from those of the type.

(5) **Pandanus Vidalii** Martelli sp. nov.

Arbor 9–12 m alta. Folia ultra bimetralia, 8 cm lata, coriacea, sursum attenuata, apice obtusiuscula, per totam longitudinem plicata, plicis lateralibus inermibus, utrimque longitudinaliter crebre minuteque nervulosa, ad basin levia dentibus marginalibus inferioribus robustis, latis, subinaequalibus, acutis, patulis, superioribus multo minoribus crebrioribus acutis, sursum curvatis, adpressis; costa media tenui, acute prominenti, prope basin crebrerrime retroflexe spinulosa, spinis inaequalibus, caeterum inermi, in parte apicali spinis minutis, gradatim remotiusculis, acutis, erecto-adpressis munita. Syncarpium solitarium, pedunculo 30 cm longo suffultum, ovatum, 12 cm longum, 10 cm latum. Phalanges numerosae, tetra- penta- vel hexagonae, 3.5 cm longae, 1.5–2 cm latae, in dimidia superiori parte liberae et divaricatae, in medio leviter inflatae, infra obpyramidatae et basin versus sensim attenuatae, in vertice truncatae et planae, loculis 8 vel 9, parvis, pyramidatis, sulcis interlocularibus profundis, stigmate hypocrepiformi terminatis.

LUZON, Province of Bataan, Limay Peak, *Whitford 1325* (type), May, 1905, above 850 m alt., at the head of the Lamao River.

This species is easily distinguishable from *Pandanus tectorius* Sol., and *Pandanus exaltatus* Blanco, by the form of the phalanges which have their upper half free and very divaricate, by the small but deep locules, and even by some characteristics of the leaves. It seems to me that the figures representing the syncarp, the separate phalanges and section, in Vidal "Flora Forestal de Filipinas" *tab. 95, fig. A* (under *Pandanus odoratissimus*), belong to this new species. It is true that the leaves are represented as very small and quite different from those of the species here described, but the plate seems to me not to have been drawn very scientifically and therefo

tion in the leaves. It is to be regretted that the figures in the "Flora Forestal" are not accompanied by a description of the plant. I have named this *Pandanus* in memory of the clever botanist Señor Sebastian Vidal, who died prematurely after having contributed much to our knowledge of the Philippine Flora.

(6) **Pandanus coronatus** Martelli sp. nov.

Folia juniora fere 1 m longa, circiter 14 cm lata, subcoriacea, longe flagellato-attenuata, supra nitida, subtus minute longitudinaliter venosa, ad margines dentibus validis, acutis, erecto-patentibus armata; costa media dentibus (marginalibus simillimis sed minoribus ac remotioribus) basin versus retroflexis armata. Syncarpium globosum, fere 14 cm diam. Phalanges circiter 50, 3.5 cm longae, 2.5–3 cm latae, irregulariter acute pentagonae, usque ad tertiam inferiorem partem liberae,

ad basin partis liberae, quae est prismatica corona turulosa plus minus prominenti praeditae, infra medium abrupte obpyramidatae et basi acutae, in summo vertice convexiusculae; loculis 9–12, nonnihil convexis; sulcis interlocularibus superficialibus; columna stigmatifera robusta abrupte prominente, stigmatibus latis hippocrepiformibus erectis vel obliquis.

MINDANAO, Province of Surigao, Surigao, *Bolster*, 283, 232, March, 1906, common along the seashore.

Pandanus coronatus *forma* α **minor.**

Phalanges minores, 3 cm longae, 2–3.5 cm latae, pyriformes, pentagonae, corona vix vel tantum ad angulos manifesta, loculis 7 vel 8.

MINDANAO, Province of Surigao, Surigao, *Bolster 282*, March, 1906, along the seashore in coral sand.

Pandanus coronatus is a very characteristic species because of the general aspect of the syncarp, which has a distinct internal line of demarcation where the phalanges separate and where those at the base of the prismatic portion are furnished with a distinct ring or crown, which is sometimes small, or is evident only at the corners of the phalanges, as in form α.

(7) **Pandanus radicans** Blanco Fl. Filip. (1837) 780; Elmer Leaflets Philip. Bot. 1 (1906) 74.

LEYTE, Palo, *Elmer 7200*, January, 1906, in small groups in alluvial overflows along rivers and in marshes where *Caladium* and other subaquatic plants abound.

I am following Mr. Elmer in referring the specimen mentioned above to *Pandanus radicans* Blanco, although it is quite impossible to identify that species by the description alone. From the fact that Mr. Elmer collected his specimens in the Island of Leyte, the same region from which Blanco received his *Pandanus radicans* and because of the correspondence in the vernacular name, no better means of determination being possible, we may conclude that Mr. Elmer has correctly identified this species.

(8) **Pandanus botryoides** Martelli sp. nov.

Folia ultra bimetralia, 8 cm lata, coriacea, apice sensim acuminata, basi non dilatata, pagina inferiori glauca, superiori transverse minute tessellata, utrimque longitudinaliter venoso-striata, in ima basi levia, marginibus crebrerrime serratis, dentibus parvulis; costa media valida prominenti, acuta, spinis pusillis, apicem versus magis manifestis, adscendentibus, approximatis, in ultima basi retroflexis armata. Syncarpia 4 vel 5, in racemo majusculo, trigono disposita, subsessilia, 14 cm longa, 11 cm diam., ovoidea; phalanges numerosae, 4 cm longae, 12–18 mm latae, obpyramidatae, penta- vel hexagonae, basi angustatae, vertice subrotundatae, supra planae, loculis 4–6, vel interdum 8, parvis, pyramidatis, angulosis, acutis, interdum inconspicuis, sulcis interlocularibus plus minusve profundis vel vix manifestis. Stigma ad verticem loculorum planum hippocrepiforme.

MINDANAO, Province of Surigao, Catel, *Merrill 5442*, October, 1906, along tidal streams.

This species belongs to the section *Keura* and perhaps possesses narrower phalanges than any hitherto described. The racemose disposition of the syncarps is of very rare occurrence in the species of this section, which is a very interesting and characteristic peculiarity of *Pandanus botryoides*. Sometimes in this species the locules of the phalanges are so obscurely or indistinctly separated one from another that they appear almost wanting, but in other phalanges locules are well defined and separated by distinct interlocular furrows.

(9) **Pandanus luzonensis** Merr. in Govt. Lab. Publ. 17 (1904) 6, *t. 1, 2*.

Pandanus calycarpus Martelli in Webbia 1 (1905) 365.

LUZON, Province of Bataan, Lamao River, *For. Bur. 91 Barnes*, November, 1905; *Merrill 3317*, October, 1905; *Elmer 6662*; Province of Rizal, *For. Bur. 2702 Ahern's collector*.

My diagnosis of *Pandanus calycarpus* was made from a few phalanges preserved in the Botanical Museums of St. Petersburg and Munich (kindly communicated to me by their directors) apparently of the same gathering but without any indication regarding locality or collector. Not being aware of the publication of *Pandanus luzonensis* Merrill, I described about a month afterwards in "Webbia" this same species under the name of *Pandanus calycarpus*, erroneously but not definitely referring it to the section *Sussea*. I am now of the opinion that it is best for the present, at least, to ascribe it to the section *Keura*, as it is possible that in a general revision of the genus *Pandanus* I shall be obliged to take out the species of that section. Mr. Merrill gives a complete description of the male as well as of the female plant of this species and it does not seem to me a *Vinsonia*.

§ HOMBRONIA.

(10) **Pandanus dubius** Spreng. Syst. 3 (1826) 897; Merrill in Govt. Lab. Publ. 17 (1904) 8.

MINDANAO, District of Davao, Malalag, *Copeland 613*, March, 1904, along the seashore, rare.

Mr. Merrill considered that *Pandanus radicans* Blanco was a synonym of *Pandanus dubius*. I do not know the reasons for this identification, as Blanco's description of *Pandanus radicans* is so indecipherable that I am obliged to acknowledge my inability to guess to what of the known species it can be reduced. Mr. Elmer refers to *Pandanus radicans* a specimen which he collected in Leyte, and perhaps he may be right, as noted above. *Pandanus latifolius* Perr. in Mém. Soc. Linn. Paris 3 (1824) 134, is probably this species.

(11) **Pandanus utilissimus** Elmer, Leaflets Philip. Bot. 1 (1906) 81.

LUZON, Province of Tayabas, near Lucban, Mount Banajao, *Elmer 7379*, May, 1906.

This is a splendid species, very characteristic because of the peculiar shape of its drupes. Another species (not yet described) which seems allied to it was discovered by Mr. Giulianetti, near Port Moresby in British New Guinea, but of it, only some old drupes were sent to the Kew herbarium.

(12) **Pandanus simplex** Merr. in Govt. Lab. Publ. 29 (1905) 6.

LUZON, Province of Tayabas (Infanta), Tinuan River, *Whitford 782*, September, 1904, on the tops of hills at 150 m alt.

§ SUSSEA ?

(13) **Pandanus pallidus** Merr. in Govt. Lab. Publ. **29** (1905) 5.

LUZON, Province of Benguet, Baguio, *Elmer 5840*, March, 1904.

At first sight this species seems to belong to the section *Sussea*, but a careful study of the disposition of the locules as well as a section of the phalanges, leaves me somewhat uncertain about this classification. Perhaps it may be a type of a new section, but I require complete material and especially the male flowers to allow me to solve the question. All the species of *Sussea* hitherto known grow in Africa.

§ BRYANTIA.

(14) **Pandanus gracilis** Blanco Fl. Filip. (1837) 778; ed. 3, **3**: 182, *t. 440;* Merrill in Govt. Lab. Publ. **27** (1905) 89.

Pandanus Whitfordii Merrill l. c. **17** (1904) 7.

LUZON, Province of Bataan, Mount Mariveles, *Whitford 50, 351, 507; For. Bur. 2944 Borden:* Province of Rizal, Montalban, *Loher 1573* (in Herb. Kew). MINDANAO, District of Davao, Baroring River, *Copeland 1437*, October, 1904.

Mr. Merrill has already recognized the similarity between his *Pandanus Whitfordii* and *Pandanus gracilis* Blanco, and placed the former in the section *Sussea*, but it is better perhaps to ascribe it to *Bryantia*.

(15) **Pandanus paloensis** Elmer, Leafl. Philip. Bot. **1** (1906) 75.

LEYTE, Palo, *Elmer 7343*, January, 1906, very common in the shrubby forests of the low hills and in the *Barringtonia* formation near the seashore and along the larger rivers.

This species seems to me to be closely allied to *Pandanus gracilis* Blanco and perhaps not sufficiently distinct, or only a variety of Blanco's species. To determine its validity, well prepared and complete specimens are necessary.

(16) **Pandanus Clementis** Merr. in Philip. Jour. Sci. **1** (1906) Suppl. 178, *t. 1.*

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens*, March, 1906, alt. 800 m. Mount Malindang, *For. Bur. 4671 Mearns & Hutchinson*, May, 1906.

A species of the section *Bryantia* belonging to the group with *Pandanus polycephalus* Lam.

(17) **Pandanus glauciphyllus** C. B. Robinson in Bull. Torr. Bot. Club. **35** (1908) 64.

MINDANAO, District of Zamboanga, San Ramon, *Copeland* s. n. (in Herb. Bur. Sci.), March, 1905, in high forests at the top of the mountain at 900 m alt.

(18) **Pandanus lateralis** Martelli sp. nov.

Prostratus vel erectus, 1–6 m altus. Folia ad extremitates ramorum congesta, fere 2 m longa, 4 cm lata, in ima basi dilatato-rotundata, usque ad medium auguste plicato-canaliculata, dein plicato-expansa, apice sensim attenuata, acuta, in pagina inferiori minutissime longitudinaliter venulosa, superne nitida, plicis lateralibus apicem versus, longo tractu, minute acuteque aculeatis; marginibus, ima basi excepta, acute serratis; costa media, in parte apicali, subtiliter prominula, acuta, spinis sparsis minutissimis serrulata; in parte inferiori evanida et inermi; in parte basilari aculeis validiusculis, brevibus, reverse uncinatis armata. Racemus lateralis (non apicalis) brevis, spathis plurimis, ut videtur,

involucratus (*in specimine suppetenti spathae delapsae sunt*); pedunculus subgracilis, 5 cm longus, 7 mm crassus, trigonus; syncarpia ad 4, conferta, ovata, 4 cm longa, 3 cm diam. Drupae numerosae, confertae, parvae, 12 mm longae, 5–7 mm latae, pentagonae vel hexagonae, basi angustato-cuneatae, apice libero, rotundato anguloso, vertice areolato, subconcavo; stigmate eccentrico, subplano, sessili, elongato, 5 mm longo, subrotundato-bilobo; endocarpio osseo, 6 mm longo, cuneato; mesocarpio supero, ejus caverna 1 mm alta.

MINDANAO, District of Davao, Davao, *Copeland 386*, March, 1904 (in Herb. Bur. Sci.).

(19) **Pandanus brevispathus** Martelli sp. nov.

Arbor 3 m alta, corona foliorum apicali ornata. Folia bimetralia, 4 cm lata, basi dilatata amplexicaulia, apice sensim attenuato-acuminata, in pagina inferiori glauca et minutissime longitudinaliter venuloso-striata; supra plicata, plicis lateralibus apicem versus irregulariter parceque aculeatis; marginibus crebre et validiuscule serrato-dentatis; costa media e basi usque ad medium subtilissima, inermi, dein prominula, angusta, acuta, apicem versus crebre et acute serrulata. Syncarpii pedunculus brevis, 6–7 cm longus, trigonus, 1 cm crassus, spathis numerosis, coriaceis, arcte involucratus. Spathae inferiores brevissimae, triangulari-lanceolato-acuminatae, basi late amplectentes, cymbaeformes, caeterae sensim majores, e quibus intermediae elongato-lanceolatae syncarpium subaequantes, plus minus acute carinatae, marginibus et carina, apicem versus tantum, serratis; spathae superiores syncarpium involucrantes, 4 cm latae, subcoriaceae, ovato-elongatae, apice rotundatae, acutiusculae, carina et marginibus creberrime ciliato-serrato-dentatis. Syncarpium ovato-globosum, 3–4.5 cm diam.; drupae numerosae, confertae, polygonae, basi anguste cuneatae, 15 mm longae, 4–5 mm latae, apice libero pyramidato-rotundato, in summo vertice concavae, areolatae, gibbosulae; stigmate subeccentrico, plano, sessili, 2 mm lato, subrotundato-bilobo. Endocarpium osseum, 9 mm longum, mesocarpium superum, ejus lacuna 3 mm longa.

MINDANAO, District of Davao, Davao, *Copeland 442*, March, 1904, in jungles in the *Barringtonia* formation.

A species of the section *Bryantia*, very different from *Pandanus lateralis*, from which it is easily distinguishable by its solitary syncarp and by the shape of the spathes. *Pandanus brevispathus* is closely related to a species collected by Dr. Beccari at Kandari in Celebes, which Count Solms-Laubach in Ann. Jard. Bot. Buitenzorg **3** (1883) 90, has referred to *Pandanus Kurzianus* Solms, although in my opinion not correctly.

Copeland's specimen, on which I have founded this species was identified by Mr. Merrill as *Pandanus polycephalus* Lam., from which it seems to me to be quite distinct. The group of *Pandanus polycephalus* Lam. embraces several distinct species, very similar, however, to one another. In consequence of the incompleteness of Lamarck's description of that species, different authorities have

referred to it quite different plants, causing great confusion, to dispel which it is necessary to have a full series of specimens, and to make a general study of the entire group.

I have in my herbarium many specimens of the true *Pandanus polycephalus* Lam., collected in Amboina, Ceram, Timor, etc., and some others from the Botanical Gardens at Buitenzorg and Singapore, kindly sent to me by Dr. Treub and Mr. Ridley; but the typical form has not yet been found in the Philippines, where, however, some species allied to it have been discovered.

§ CRISTATA Martelli.

(20) **Pandanus Cumingianus** Martelli sp. nov.

Racemus densus, 25 cm circiter longus, spathis longe acuminatis ut in *Pandano polycephalo* Lam. involucratus. Syncarpia conferta, sessilia, parva, dum fere matura, 2.5 cm lata, 2–3 cm longa, ovato-subglobosa, trigona, faciebus subplanis; drupis confertis, unilocularibus, 7 mm longis, 3–4 mm latis, basi subcuneatis, pentagonis vel hexagonis, apice rotundato-anguloso, abrupte in stylum brevem prominentem, eccentricum, transverse evolutum, contractis. Stigmate latiusculo, cristato.

NEGROS, in the mountains, *Cuming s. n.* (in Herb. Mus. Brit.).

This species is represented in the collections of the British Museum by two racemes only, of which Dr. Rendle kindly sent me a photograph. The syncarps unfortunately exhibit the drupes not quite mature, but I think this circumstance cannot affect their general aspect, except perhaps, only slightly the size of the drupes. The entire raceme, as regards its structure, appears like that of *Pandanus polycephalus* Lam., but the characteristic shape of the stigmatiferous part, and also the stigma itself, are so peculiar as to suggest for this species a provisional section to be called "*Cristata*."

§ RYKIA.

(21) **Pandanus malatensis** Blanco Fl. Filip. ed. 2 (1845) 36.

Folia verisimiliter bimetralia (integra non vidi), 6–7 cm lata, basin versus plicato-canaliculata, levia, caeterum utrimque longitudinaliter venulosa et transverse validiuscule tessellata, ex quo (in sicco) scabrida apparent; plicis lateralibus inermibus; marginibus remote dentatis, basin versus dentibus validis divaricatis, latis, apicem versus minoribus et adpressis; costa media tenuis, acuta, prominula, inermis, inferne levis et late rotundata, longo tractu spinis raris, dentibus marginalibus similibus sed recurvis, armata. Spathae sensim decrescentes, inferiores foliis simillimae sed multo breviores, 80 cm longae, basin versus attenuatae, naviculares, apice lanceolato-attenuato-acuminatae et in longissimum flagellum trigono-subulatum denticulatum protractae, plicis lateralibus inermibus, apice acute confluentibus, costa media subtus apicem versus spinuloso-serrata, spathae apicales minores, ovato-lanceolatae vel ellipticae, breviter acuminatae, naviculares, acute carinatae, pulchre et utrimque longitudinaliter nervoso-striatae, marginibus et carina apicem versus tantum denticulatis. Inflorescentia ♂ tantum nota, 50 cm et ultra longa, spicata; spiculae elongatae, crassae, a spathis involucratae;

columnae staminiferae confertae, plus minusve elongatae ad apicem partito-ramosae candelabriformes, antherae latae, 5 mm longae, longiuscule et crassiuscule pedunculatae, utrimque rotundatae, apice abrupte longe apiculatae.

LUZON, Manila (Malate) *fide* Blanco: without locality, living plant flowering in the Paris Botanical Garden in 1868, collected by *Porte* (in Herb. Paris).

Blanco's description of *Pandanus malatensis* is very short and obscure, but it does not disagree with the male specimens here described which are preserved in the Paris herbarium under the name of *Pandanus rubescens* with the label: "Philippines, Avril, legit Porte, 1860, cult. in Horto Bot. Paris, 1868." From the structure and disposition of its male flowers, it may be placed, I think, in the section *Rykia*. Having asked Mr. Merrill for some information about the probable habitat of *Pandanus malatensis*, I received an answer from him that in Blanco's type locality Malate, a suburb of Manila, he has met with no *Pandanus* except *P. tectorius* Sol., which does not correspond at all with Blanco's description of *Pandanus malatensis*. The fact that no other species of *Pandanus* is now found in Malate proves very little, because it is certain that since Blanco's time many changes have occurred in the districts near Manila, and it is probable that many species of plants which were growing there sixty or more years ago have now disappeared. *Pandanus malatensis* may be one of them.

§ ACROSTIGMA.

(22) **Pandanus Merrillii** Warb. in Perkins, Fragm. Fl. Philip. (1904) 50.

PALAWAN (Paragua), San Antonio Bay, *Merrill 840*, February, 1903, on dry slopes in forests at 300–500 m alt.; Puerto Princesa, *Bur. Sci. 232 Bermejos*, December, 1905.

The type specimen of *P. Merrillii* is no. 840, collected at San Antonio Bay in Palawan; the others gathered in the same island at Puerto Princesa appear to be different, since they carry only a terminal shoot of young leaves which are smaller, 70–80 cm in length, and 2–2.5 cm in width, with the midrib smooth or very slightly spinulose near its base. The raceme however is 25 cm in length, composed of 6 syncarps, which as well as the drupes perfectly agree with those of the type specimen.

(23) **Pandanus Copelandii** Merr. in Govt. Lab. Publ. 17 (1904) 7.

Pandanus muricatus Elmer, Leafl. Philip. Bot. 1 (1906) 76.

NEGROS, Gimagan River, *Copeland 140*, January, 1904, in forests at an altitude of 100 m. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 679*: Province of Surigao, Surigao, *Bolster 203*, December, 1905. SAMAR, Borongan, *Merrill 5215*, October, 1906. LEYTE, near Palo, in alluvial soil along the Bangon River, *Elmer 7201*, January, 1906 (*P. muricatus* Elm.). LUZON, Province of Rizal, *For. Bur. 3433 Ahern's collector*; Limutan, *Loher 1571* (in Herb. Kew).

Mr. Loher sent to Kew as no. 1571 a specimen of this *Pandanus*, collected by himself at Limutan, Luzon. He supposed it to be *Pandanus foetidus* Roxb. It consists of an unripe syncarp and two leaves; one of these is broader than the other and apparently belongs to *P. Copelandii* Merrill; the narrower and longer one is apparently that of a different species. It is impossible, I believe, to separate specifically Elmer's *Pandanus muricatus* from *Pandanus Copelandii* Merrill, the indicated differential characteristics being too variable and not very important. I have in my collection some large splendid specimens of *P. muricatus*, which I can not differentiate from *Pandanus Copelandii* Merrill. Some of them referred to it quite different plants, causing great confusion, to dispel which it is necessary to have a full series of specimens, and to make a general study of the entire group.

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SPECIES DUBIAE.

1. PANDANUS SABOTAN Blanco Fl. Filip. (1837) 779.

See above under *Pandanus tectorius* var. *sinensis*.

2. PANDANUS INERMIS Blanco Fl. Filip. ed. 2 (1845) 537.[1]

Blanco's description of this species is so short that it is impossible for me even to surmise to what kind of plant it may be applied. It is doubtful even if it is a *Pandanus* because of its: "Hojas esparcidas," but if it is a *Pandanus* I do not know any unarmed except *Pandanus tectorius* var. *laevis* Warb. (*Pandanus laevis* Kunth), of which only the male plant is known. This variety, I think, does not grow spontaneously anywhere, but is a domestic form, multiplied by agamic reproduction, widely distributed and cultivated in many places, its pollen being used as a hair powder.

3. PANDANUS LATIFOLIUS Perr. in Mém. Soc. Linn. Paris, 3 (1824) 134.

From a small island at the entrance of Basilan Strait, imperfectly described. (See *Pandanus dubius* Spreng. p. 67 above.)

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[1] *Pandanus inermis* Blanco is almost certainly the same as *Dracaena angustifolia* Roxb., a common and widely distributed species in the Philippines, and which Blanco does not consider in his "Flora de Filipinas" unless as *Pandanus inermis*. (E. D. M.)

THE PHILIPPINE PLANTS COLLECTED BY THE WILKES UNITED STATES EXPLORING EXPEDITION.

By Elmer D. Merrill.

(*From the Botanical Section, Biological Laboratory, Bureau of Science, Manila, P. I.*)

Volumes 15, 16, and 17 of the reports of the Wilkes United States Exploring Expedition deal with botany, the two first published in 1854 and the last from 1859 to 1874. The first of these by Asa Gray, entitled "Botany, Phanerogamia, Vol. 1" (volume 15 of the whole), consisting of 717 pages of text, quarto, and a folio atlas of 100 plates, and considering the flowering plants from *Ranunculaceæ* to *Loranthaceæ*, is the one treated of in detail in the following paper, although in this introduction it has been considered advisable to include some notice of the other two volumes dealing with the vascular and cellular cryptogams, so far as they apply to the Philippines.

Volume 16, entitled "Botany, Cryptogamia, Filices including Lycopodiaceae and Hydropterides," by William D. Brackenridge, was published in 1854, consisting of VIII + 357 pages, quarto, and a folio atlas of 46 plates. In this work seventy-seven species of Philippine ferns are enumerated, of which fifteen were described as new. Most of the specimens on which this list was based are to be found in the United States National Herbarium. From the "Letters of Asa Gray" published in 1893, some information is obtainable regarding this very rare work. On pages 404 and 405 we learn that Dr. Gray edited Brackenridge's manuscript, and read the proofs of the work, and on page 432 we further learn that "a fire in Philadelphia consumed all the edition except ten copies which has been sold mostly in Europe" and that "the Government lost a part of their small impression." As a consequence of this disaster the work is very rare, but Mr. W. R. Maxon of the United States National Herbarium informs me that partial or complete copies of the work are to be found in many of the State libraries in the United States, these presumably originating from the distribution of that part of the Government's quota which escaped the fire.

Volume 17 consists of several papers published at various times, the first few consider the vascular cryptogams, while the last by John Torrey, entitled "Phanerogamia of the Pacific Coast of North America," having no bearing on Philippine botany, is not discussed here. The first paper in the volume is by W. S. Sullivant, on the mosses, this being published privately in 1859, an imperial folio of 32 pages and 26 plates. Three species of Philippine mosses are included, two of them with descriptions, although diagnoses had previously appeared in the Proceedings of the American Academy **3** (1857) 181-185. In 1862, the remainder of the work treating of the vascular cryptogams was published, the second paper being an enumeration of the lichens by Edwin Tuckerman, no Philippine forms being considered. In a following paper, pages 155 to 192, J. W. Bailey and W. H. Harvey deal with the algae and diatoms, six species of the former being enumerated from the Philippines, of which one was new, and twenty-six species of the latter, of which five were new, these new species also having been previously described.[1] The last paper on cellular cryptogams is one on fungi by M. A. Curtiss and M. J. Berkeley, pages 195 to 202, in which a single Philippine species is enumerated.

One other work, although not published as a Wilkes Expedition report, which treats of the botany of the expedition, is the second part of Pickering's "Geographical Distribution of Animals and Plants," which was published in 1876. This work was prepared for the Wilkes Expedition reports, and part 1 was issued as such, part 2 being published by the author privately, after Government appropriations for printing had been withdrawn. It consists of 524 pages, ending abruptly, the remainder never having been printed. The Philippines are considered from page 491 to the end, the work ending in the middle of the enumeration of Mangsi (Philippines) plants. Here are listed approximately 500 species of Philippine plants, for the most part without specific identifications and in many cases not even determined to the family. However, from this list, it is evident that many species of plants were collected in the Philippines that were not included in other published reports, some of which appear not to be represented by extant specimens.

The Wilkes Expedition reached Manila on January 13, 1842,[2] and botanical collections were made from this date to the 20th of the month in the vicinity of the city and on a trip inland up the Pasig River and across Laguna de Bay. Messrs. Pickering and Eld proceeded to Santa Cruz and Majaijai, from the latter place ascending Mount Majaijai (Mount Banajao) on January 17, while Messrs. Rich, Dana and Brackenridge went to the town of Bay with the object of proceeding to Taal Volcano, but finding the latter trip impracticable they went to Los Baños and made a partial ascent of Mount Maquiling, being later joined by Messrs. Pickering and Eld and then returning to Manila. Botanical collections were made by both parties. Leaving Manila, January 20, the expedition sailed southward, the next place where collecting was done being Caldera near Zamboanga, Mindanao, a portion of January 31 being spent there. From Caldera the ship proceeded to Soung (now Jolo) on the Island of Sulu or Jolo, and February 4 and 5 were spent there and on Marongas Islet, but because of the unfriendly attitude of the natives little collecting could be done except along the beach. Leaving Jolo they then proceeded across the Sulu Sea, making no stop until the Mangsee (Mangsi) Islands, two small islands between the larger ones of Balabac and Banguey, were reached, where they remained from February 8 to 12, the expedition then proceeding through Balabac Strait to Singapore.

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[1] *Proc. Acad. Philad.* **6** (1854) 430, 431, reprinted in *Quart. Journ. Micros. Sci.* **3** (1855) 93, 94.

[2] Pickering. Geog. Distr. Animals and Plants **2** (1876); Wilkes, Narrative **5** (1845) 272-367.

In 1836, Asa Gray was tendered and accepted the appointment of botanist to the expedition, but in 1838, because of delays in the start, and other work claiming his attention, he resigned. In 1848, some time after its return, he was appointed to work up the reports of the flowering plants and estimated that this report would fill three volumes of text. However, only one volume of Gray's part appeared, although we learn from his letters that as late as 1858 he was still working on the manuscript of additional portions which never were published. Moreover, there are many specimens in the United States National Herbarium bearing his manuscript names of species that have not as yet been published, most, if not all of which, so far as Philippine plants are concerned, are now antedated in publication by the names of other authors. In volume 15 (Phanerogamia, vol. 1) one hundred and four species of Philippine plants are enumerated of which fifteen were described as new; these are considered in the present paper.

While I was in Washington in July and August, 1907, I had an opportunity of examining the Wilkes Expedition specimens in the United States National Herbarium, and later, search was made in the Gray Herbarium at Cambridge and in the Herbarium of Columbia University, now at the New York Botanical Garden, for specimens which could not be found at Washington. Still later, in November and December of the same year, an opportunity occurred of comparing my critical notes, sketches, photographs, etc., with various types in the herbaria of the Royal Gardens at Kew and of the British Museum. As a result of the examination of the above material it has been considered worth while to complete my notes and prepare the accompanying list for publication.

The most complete set of Wilkes Expedition plants is preserved in the United States National Herbarium at Washington, but even it lacks many specimens. Partial sets are to be found in the Gray Herbarium at Cambridge, and in the Herbarium of Columbia University, and there are a few sheets at the Royal Gardens, Kew, England. Representatives of fourteen of the Philippine species considered by Gray, were not to be found in the United States National Herbarium, and but four of this number were found elsewhere, one, *Hemigyrosa perrottetii* Bl., being represented in the Gray Herbarium, and three, *Derris uliginosa* Benth., *Sophora tomentosa* Linn., and *Rubus rugosus* Sm., in the Columbia University Herbarium. Many of the species mentioned by Pickering, such as *Gahnia*, *Cnicus*, etc., were not found, but more careful search may reveal them in some one of the above institutions, although it seems evident that a considerable number of the Wilkes Expedition plants are no longer extant. Only ninety-six species of Wilkes Expedition Philippine flowering plants were found in the United States National Museum that were not considered by Gray, and most of these represent common and widely distributed species.

All Philippine plants collected by the Wilkes Expedition that are mentioned by Gray in his one published volume on the botany of the Wilkes Expedition are enumerated in the list given below. Where no doubt exists as to the correctness of his identification no comment is made. No attempt has been made to discuss the ferns in the present paper, and it has not been thought worth while to enumerate the species represented in the United States National Herbarium that were not considered by Gray. The present paper will serve to clear up a number of points in regard to the synonomy of Philippine species, and an examination of the authentic specimens in the light of our present knowledge of Philippine botany has enabled me to correct several errors in identification on the part of Dr. Gray.

The photographs of the four types here reproduced were supplied me by Dr. J. N. Rose, associate curator of the United States National Herbarium, and are here published with the consent of the Secretary of the Smithsonian Institution.

ANONACEÆ.

Guatteria pallida Blume ? (p. 27). "Hab. Baños, near Manilla, Luzon, a poor specimen, with young fruit, destitute of flowers, which I can only doubtfully refer to Blume's *G. pallida*, with the figure of which it pretty well accords." The specimen is *Goniothalamus elmeri* Merr., a common endemic species.

Anaxagorea luzonensis sp. nov. (p. 27). "Hab. mountains near Baños in the Island of Luzon. (Also in Cuming's Philippine collection, No. 831)." A very common and widely distributed species.

MYRISTICACEÆ.

Myristica cinerea Poir. ? (p. 35). "Hab. Caldera, Mindanao, Philippine Islands." Leaf specimens only, identical with *Myristica mindanaensis* Warb., an endemic species, known only from Mindanao.

MENISPERMACEÆ.

Cissampelos discolor DC. ? var. **cardiophylla** A. Gray (p. 38). "Hab. small island in the Sooloo Sea." Apparently only a form of *Cissampelos pareira* Linn., common throughout the Archipelago, and the Tropics generally.

CAPPARIDACEÆ.

Polanisia icosandra Wight & Arn. (p. 68). "Hab. Luzon, near Manilla."=*P. viscosa* DC. A common weed throughout the Archipelago.

Capparis aurantioides Presl (p. 70). "Hab. Philippine Islands, at Caldera, Mindanao, and the Sooloo Islands." Fragmentary specimens of a species somewhat resembling *Capparis micracantha* DC., possibly correctly identified with Presl's species.

Capparis sepiaria Linn. (p. 70). "Hab. small island of the Sooloo Sea." The common form of the species, widely distributed in the Indo-Malayan region.

Capparis cerasifolia sp. nov. (p. 71). "Small island of the Sooloo Sea, same as Cuming's No. 1068 from the Philippine Islands." This has been reduced by some authors to *Capparis horrida* Linn., but is apparently a distinct and valid species. The type is well matched by No. 658 Copeland, and Nos. 2152 and 2200 R. S. Williams, from Mindanao. It is quite distinct from No. 1068 Cuming which Gray also refers here.

Capparis odorata Blanco ? (p. 71). "Hab. vicinity of Manilla, Luzon (without flowers or fruit)." The specimen is *C. micracantha* DC., a very common species in the Philippines.

CARYOPHYLLACEÆ.

Drymaria cordata Willd. (p. 123). "Hab. .
in mountains near Manilla: doubtless introdu
Philippines.

MALVACEÆ.

Malvastrum tricuspidatum Gray (p. 148). "Hab. . . . . Manilla, Luzon." The oldest name for the species is *M. coromandelinum* (Willd.) Garcke. A common weed.

Sida rhombifolia Linn. (p. 158). "Hab. . . . . Luzon, ... the var. with *pointless or barely mucronate carpels.*" No specimens found. A widely distributed species.

Sida acuta Burm. (p. 159). "Hab. . . . shores of Laguna, Baños, Luzon." No specimens found; common and widely distributed.

Sida javensis Cav. (p. 160). "Hab. near Manilla, Luzon." Rather common locally in Luzon.=*S. humilis* Willd.

Abutilon indicum Don (p. 167). "Hab. near Manilla and Baños: common in waste places." A very common weedy plant.

Urena lobata Linn. var. **scabriuscula** (DC.) A. Gray, (p. 169). "Hab. . . . . mountains near Baños, Luzon (Philippine Islands, Cuming No. 460)." Very abundant and widely distributed.

Abelmoschus moschatus Moench (p. 172). "Hab. . . . Mindanao, Philippine Islands. . . ." A common weed; widely distributed.

Paritium tiliaceum A. Juss. (p. 178). "Hab. . . . Luzon, near Manilla." *No specimens found; a species very common along the seashore throughout the* Archipelago.

Thespesia populnea Correa (p. 179). "Hab. . . Mangsi Islands." No specimens found; common and widely distributed.

STERCULIACEÆ.

Heritiera littoralis Dryand. (p. 184). "Hab. Sooloo Islands. . . ." Specimen not found; common along the seashore throughout the Philippines.

Sterculia ceramica R. Br. (p. 184). "Hab. small island in the Sooloo Sea." The specimen is *Sterculia luzonica* Warb. A littoral tree, known from the Philippines, Celebes, and Halmaheira.

Melochia corchorifolia Linn. (p. 191). "Hab. . . . . Baños, Luzon." Very common and widely distributed in the Philippines.

Pterospermum diversifolium Blume ? (p. 194). "Hab. shores of Laguna, Baños, Luzon." The specimens represent Blume's species, which is common and widely distributed in the Philippines.

TILIACEÆ.

Corchorus olitorius Linn. (p. 195). "Hab. shores of Laguna, Baños, Luzon, Philippine Islands." A common and widely distributed weed.

Corchorus capsularis Linn. (p. 196). "Hab. shores of Laguna, Baños, Luzon." Common and widely distributed in the Philippines.

Triumfetta annua Linn. (p. 197). "Hab. vicinity of Manilla, Luzon. (The same as Cuming's no. 1402, from the Philippine Islands)." The specimen is *Triumfetta rhomboidea* Jacq., as is No. 1402 Cuming.

TERNSTROEMIACEÆ.

Calpandra lanceolata Blume (p. 213). "Hab. mountains near Baños, Luzon, Philippine Islands." The specimen is *Thea montana* (Blanco) Merrill.

GUTTIFERÆ.

Garcinia mangostana Linn. (p. 217). "Hab. Mangsi Islands." The mangosteen is commonly cultivated in the Sulu Archipelago.

Calophyllum inophyllum Linn (p. 218). "Hab. . . . Mangsi Islands." Common along the seashore throughout the Philippines.

Calophyllum spectabile Willd. (p. 218). "Hab. . . . . Mangsi Islands." Leaf specimens only, representing a species unknown to me but certainly not *C. spectabile*.

RUTACEÆ.

Atalantia monophylla DC. (p. 234). "Hab. on a small island in the Sooloo Sea. (Flowers occasionally trimerous)." Specimen very fragmentary, possibly the same as *Atalantia retusa* Merr., not *A. monophylla*.

Triphasia monophylla DC. (p. 234). "Hab. in mountains in the neighborhood of Baños, Luzon (without flowers or fruit)." Apparently the young spiny state of *Atalantia disticha* (Blanco) Merr.

Triphasia trifoliata DC. (p. 234). "Hab. in the vicinity of Manilla, Luzon." Common in the Philippines.

Sclerostylis atalantioides Wight & Arn ? (p. 234). "Hab. Mangsi Islands in the Sooloo Sea . . . . the same as No. 991 of Cuming's Philippine Collection." = *Atalantia disticha* (Blanco) Merr., a species common and widely distributed in the Philippines, and of which *A. nitida* Oliv., is another synonym.

Murraya exotica Linn. (p. 235). "Hab. Philippine Islands, near Manilla, Luzon." The Malayan form usually so identified, common in the Philippines.

Micromelum pubescens Blume (p. 235). "Hab. Mangsi Islands in the Sooloo Sea." The specimen is *M. tephrocarpum* Turcz., a species doubtfully distinct from *M. pubescens*, both being common in the Philippines.

MELIACEÆ.

Didymochiton gaudichaudianum A. Juss. ? (p. 241). "Hab. Mangsi Islands in the Sooloo Sea (without flowers or ripe fruit)." = *Dysoxylum* sp., near *D. cauliflorum* Hiern.

SAPINDACEÆ.

Schmidelia racemosa Linn. (p. 249). "Hab. island in the Sooloo Sea (in flower only)." The specimen is *Allophylus ternatus* Radlk.

Schmidelia obovata sp. nov. (p. 249). "Hab. . . . Mangsi Islands, in the Sooloo Sea." The specimen is *Allophylus timorensis* Blume, a common seacoast species.

Moulinsia rubiginosa Don (p. 250). "Hab. Caldera, Mindanao, one of the Philippine Islands." = *Erioglossum rubiginosum* Blume, common and widely distributed in the Philippines.

Hemigyrosa perrottetii Blume (p. 251). "Hab. Philippine Islands near Baños, Luzon." = *Guioa perrottetii* (Blume) Radlk. A very common endemic species. Specimen in Gray Herbarium, but not in the United States National Herbarium.

Cupania ? richii sp. nov. (p. 257). "Hab. near Caldera, Mindanao, Philippine Islands (in fruit only)." This has been reduced by Radlkofer to *Lepidopetalum perrottetii* Blume, but the specimen differs from the ordinary form of the latter species in its larger fruits and leaves, being well matched by No. 2100 Williams, collected near Zamboanga, Mindanao, although probably not specifically distinct from Blume's species.

Otophora Blancoi Blume (p. 259). "Hab. Baños, near Manilla, Luzon." = *Otophora fruticosa* Blume, a species very common throughout the Philippines.

Dodonaea viscosa Linn. (p. 260). "Hab. Sooloo Islands, Caldera, Mindanao." Along the seashore, common and widely distributed.

VITACEÆ.

Cissus geniculata Blume ? (p. 272). "Hab. Luzon, at Baños, near Manilla." Undoubtedly Blume's species.

Leea sambucina Willd. (p. 274). "Hab. Philippine Islands, Luzon and Mindanao." No specimens found.

RHAMNACEÆ.

Colubrina asiatica Richard (p. 277). "Hab. . . . . Sooloo Islands." Common and widely distributed along seashore throughout the Philippines. No specimen found.

HIPPOCRATEACEÆ.

Salacia macrophylla Blume (p. 286). "Hab. near Caldera, Mindanao, Philippine Islands." The specimen, which is with immature fruit only, is apparently a species of *Gelonium* related to *G. glomerulatum* Hassk. (*Euphorbiaceæ*).

OLACACEÆ.

Olax imbricata Roxb. (p. 305). "Hab. Philippine Islands; on the shores of Laguna, Baños, near Manilla, Luzon." The species is common and widely distributed in the Philippines.

OXALIDACEÆ.

Oxalis corniculata Linn. (p. 320). "Hab. . . . . Baños, Luzon." The specimen represents the form described by Thunberg as *Oxalis repens*, and considered by B. L. Robinson to be a species distinct from *O. corniculata* Linn.

ANACARDIACEÆ.

Mangifera indica Linn. (p. 364). "Hab. near Manilla." Cultivated throughout the Philippines.

BURSERACEÆ.

Canarium luzonicum (Blume) A. Gray (p. 374). "Hab. vicinity of Baños, Luzon." The specimen is *Canarium villosum* (Blume) Miq. (*C. cumingii* Engl.) Very common in the Archipelago.

LEGUMINOSÆ.

Crotalaria verrucosa Linn. (p. 390). "Hab. . . . . Baños, near Manilla, Luzon." The species is common and widely distributed in the Philippines. No specimen found.

Crotalaria calycina Schrank (p. 290). "Hab. Caldera, Mindanao, one of the Philippine Islands." A species locally common in the Philippines.

Crotalaria sessiliflora Linn. (p. 390). "Hab. Luzon, on Mount Majaijai." This species is apparently uncommon in the Philippines, but has been found by later collectors in Luzon. Specimen not found.

Indigofera tinctoria Linn. (p. 403). "Hab. . . . . . Caldera, Mindanao, Philippine Islands." Common and widely distributed.

Tephrosia piscatoria Pers. (p. 407). "Hab. . . . Luzon, near Manilla." Specimen not found, but the form credited to Luzon was probably *T. luzoniensis* Vog. (= ? *T. purpurea* Pers.)

Phylacium bracteosum Benn. (p. 407). "Hab. . . . . . Luzon, near Manilla." Common and widely distributed in Luzon.

Uraria picta Desv. (p. 430). "Hab. near Caldera, Mindanao, one of the Philippine Islands." A species locally common.

Uraria lagopoides DC. (p. 430). "Hab. . . . near Caldera, Philippine Islands . . . the same as No. 1873 of Cuming's Philippine collection." Common and widely distributed in the Philippines.

Dendrolobium umbellatum Wight & Arn. (p. 431). "Hab. small island in the Sooloo Sea." = *Desmodium umbellatum* DC., a common shrub along the seashore throughout the Philippines. Specimen not found.

Phyllodium pulchellum Desv. (p. 431). "Hab. Philippine Islands; near Baños, Luzon." = *Desmodium pulchellum* DC. Common and widely distributed in the Philippines.

Desmodium triflorum DC. (p. 432). "Hab. Luzon, Philippine Islands." Common and widely distributed in the Philippines.

Desmodium capitatum DC. (p. 433). "Hab. Baños, Luzon, Philippine Islands." Locally abundant.

Desmodium gangeticum DC. (p. 433). "Hab. Luzon; with the preceding species." Very common and widely distributed.

Desmodium leptopus A. Gray sp. nov. (p. 436). "Hab. Luzon, Philippine Islands; on mountains near Baños." The type is well matched by No. 6527 Elmer, and No. 1409 Williams, Benguet, Luzon, and No. 3043 Williams, Davao, Mindanao. A species related to, if not identical with *D. gardneri* Benth. *D. leptopus* A. Gray was first published in Plantae Junghuhnianae. (Pl. I.)

Canavalia turgida Grah. (p. 440). "Hab. Mangsi Islands . . . . " The common seacoast *Canavalia*, with broad turgid pods, confused by most authors with *C. obtusifolia* DC.

Erythrina ovalifolia Roxb. (p. 445). "Hab. near Manilla, Luzon." Locally common.

Strongylodon macrobotrys A. Gray sp. nov. (p. 448, *t. 49*). "Hab. in the mountains near Baños, Luzon, Philippine Islands." A very striking endemic species, not uncommon.

Vigna lutea A. Gray (p. 452). "Hab. Mangsi Islands." Common along the seashore throughout the Philippines.

Dolichos falcatus Linn. (p. 453). "Hab. shores of Laguna, at Baños, Luzon." Apparently not common in the Philippines, but rediscovered in Luzon by Loher.

Cajanus indicus Spreng. (p. 453). "Hab. Luzon . . . . " Commonly cultivated throughout the Philippines. Specimen not found.

Flemingia strobilifera R. Br. (p. 454). "Hab. Philippine Islands; Luzon, near Manilla and Baños." Very common throughout the Philippines.

Pongamia glabra Vent. (p. 455, *t. 53*). "Hab. . . . Mindanao, Philippine Islands, near Caldera." A tree common along the seashore throughout the Philippines.

Millettia ? luzonensis A. Gray sp. nov. (p. 456). "Hab. shores of Laguna, Baños, Luzon." The specimen is very fragmentary, as noted by Gray, and is *Gliricidia sepium* (*Jacq.*) Steud., (*G. maculata* H. B. K.), a native of tropical America, introduced into the Philippines and now widely distributed and abundant throughout the Archipelago.

Derris uliginosa Benth. (p. 457). "Hab. Philippine Islands, near Caldera, Mindanao . . . . " In tidal swamps throughout the Philippines. In the herbarium of Columbia University, but not in the United States National Herbarium.

Dalbergia cassioides Wall. (p. 457). "Hab. Philippine Islands at Caldera, Mindanao." The specimen is probably *Dalbergia ferruginea* Roxb. It consists of young leaves only.

Sophora tomentosa Linn. (p. 406). "Hab. . . . . . Mangsi Islands." A tree abundant along the seashore throughout the Philippines. Specimen not found in the United States National Herbarium, but two sheets are in that of Columbia University.

Caesalpinia sappan L. (p. 461). "Hab. small island in the Sooloo Sea." Common throughout the Philippines.

Cassia alata Linn. (p. 462). "Hab. shores of Laguna, Baños, Luzon, Philippine Islands." Common throughout the Philippines.

Piliostigma acidum Benth. (p. 470). "Hab. Philippine Islands; in mountains near Baños, Luzon." = *Bauhinia malabarica* Roxb. A common tree in Luzon.

Cynometra inaequifolia A. Gray sp. nov. (p. 473). "Hab. Philippine Islands, near Baños, Luzon (Also collected by Mr. Cuming; No. 1297)." A tree not uncommon in Luzon.

Pithecolobium dulce Benth. (p. 485). "Hab. Luzon, Philippine Islands; introduced from tropical America." Very common throughout the Philippines.

ROSACEÆ.

Rubus rosaefolius Smith (p. 501). "Hab. Luzon, near Baños . . . . . . " The common Philippine form usually so identified.

Rubus rugosus Smith (p. 503). "Hab. . . . . Luzon, ..." Undoubtedly *R. Rolfei* Vidal! No specimen in the United States National Museum or in the Gray Herbarium, but one is in that of Columbia University.

MYRTACEÆ.

Barringtonia speciosa Linn. f. (p. 508). "Hab. . . . Mangsi Islands." A tree common along the seashore throughout the Philippines. No specimen found.

Eugenia benthamii A. Gray (p. 520). "Hab. Mangsi Islands in the Sooloo Archipelago." Very fragmentary, but unquestionably identical with the specimen from Tobie Island, *Syzygium nitidum* Benth., which I have examined at Kew, and which is really the type of the species. It is matched by Nos. 2185 and 2237 Merrill, Mindoro, and is apparently a valid species.

Sonneratia acida Linn. f. (p. 550). "Hab. Luzon, in the vicinity of Manilla (in fruit)." = *S. caseolaris* Engl., a species not uncommon in the Philippines.

Eucalyptus multiflora Rich sp. nov. (p. 554). "Hab. near Caldera, Mindanao, one of the Philippine Islands." One of the few species of *Eucalyptus* found outside of Australia, and not as yet rediscovered. It has been reduced by Maiden to *Eucalyptus naudiniana* F. Müll. (Pl. 2.)

MELASTOMATACEÆ.

Memecylon calderense A. Gray sp. nov. (p. 574, Tab. 71). "Hab. near Caldera, Mindanao, one of the Philippine Islands." Reduced by Cogniaux to *M. paniculatum*, but it may prove to be a distinct species, the branches and branchlets terete.

Dissochaeta cumingii Naudin ? (p. 600). "Hab. Luzon; in the mountains near Baños." Leaf specimens only, but certainly *Astronia meyeri* Merr.

Melastoma fasciculare Naudin ? (p. 602). "Hab. Luzon, Philippine Islands, near Manilla." The specimen agrees with a cotype of Naudin's species in herb. Kew, and is to me the same as *Melastoma polyanthum* Blume, although Cogniaux reduces it with doubt to *Melastoma imbricatum* Wall. I have seen no specimens of the latter species from the Philippines.

LYTHRACEÆ.

Pemphis acidula Forst. (p. 605). "Hab. Sooloo Islands . . . ." Common along the seashore throughout the Philippines.

COMBRETACEÆ.

Terminalia catappa Linn. (p. 615). "Hab. Mangsi Islands, in the Sooloo Sea . . . ." The specimen in the United States National Herbarium marked "Mangsi" is exactly identical with a sheet in the Herbarium of Columbia University marked "Tongatabu," both specimens undoubtedly having come from the same tree, the specimen at Washington probably being wrongly labeled. Neither sheet represents *Terminalia catappa* L., but the Polynesian *Terminalia littoralis* Seem., a species not found in the Indo-Malayan region.

ONAGRACEÆ.

Ludwigia jussiaeoides Lam. (p. 619). "Hab. Caldera, Mindanao, one of the Philippine Islands." The specimen is apparently *Ludwigia prostrata* Roxb.

CUCURBITACEÆ.

Trichosanthes quinquangulata A. Gray sp. nov. (p. 645). "Hab. Mangsi Islands, in the Sooloo Sea." Apparently a valid species, not uncommon in the Philippines.

Momordica charantia Linn. (p. 646). "Hab. Luzon; at Baños, Laguna, etc." Common in cultivation and as an escape.

BEGONIACEÆ.

Begonia repens Blume (p. 658). "Hab. Luzon, on mountains in the vicinity of Baños. Specimen not found.

Begonia cumingii A. Gray sp. nov. (p. 658). "Hab. Majaijai Mountains, Luzon, same species as No. 1897 of Cuming's Philippine collection." = *Begonia philippinensis* A. DC! (Pl. 3.)

Begonia aequata A. Gray sp. nov. (p. 658). "Hab. Luzon; on mountains near Baños." The type is exactly matched by No. 8324 Elmer, a topotype. (Pl. 4.)

CRASSULACEÆ.

Bryophyllum calycinum Salisb. (p. 690). "Hab. Philippine Islands, in the vicinity of Baños, Luzon." Common and widely distributed in the Philippines.

UMBELLIFERÆ.

Hydrocotyle asiatica Linn. (p. 693). "Hab. Luzon, near Manilla." Common throughout the Philippines. = *Centella asiatica* (L.) Urban.

ARALIACEÆ.

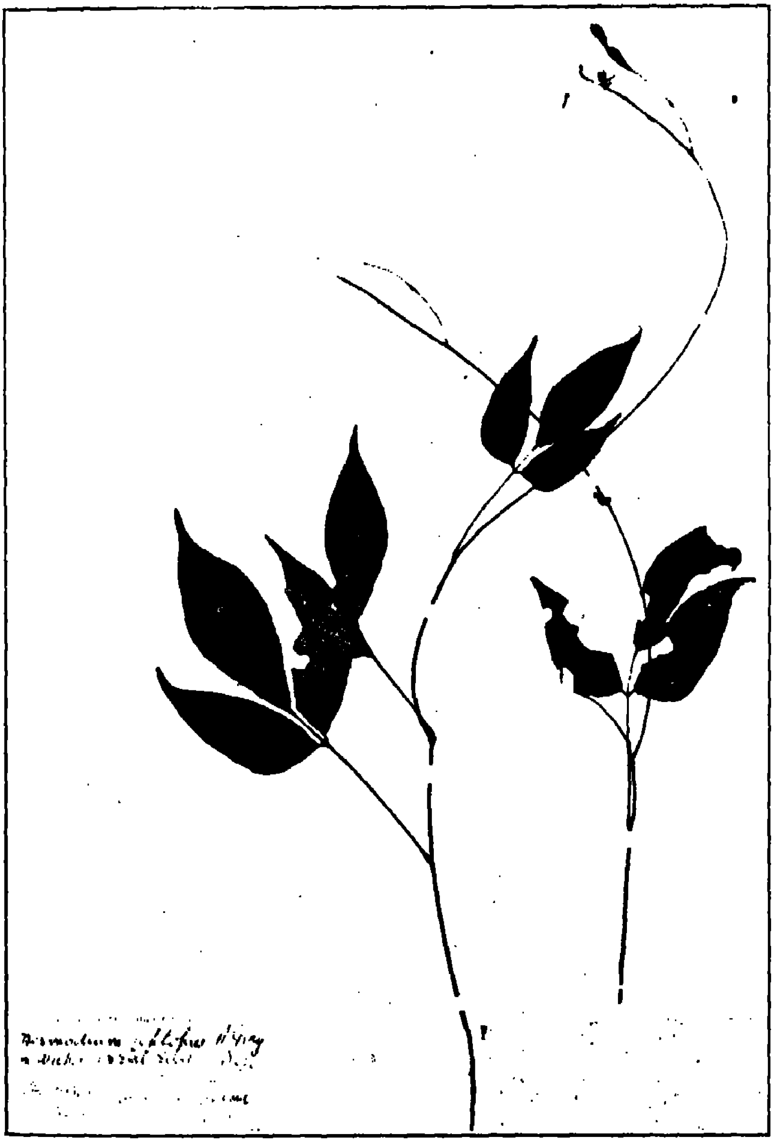
Panax fructicosum Linn. (p. 716). "Hab. Philippine Islands; near Baños, Luzon." Very commonly cultivated throughout the Philippines, for ornamental purposes.

LORANTHACEÆ.

Loranthus philippensis Cham. & Schlecht. (p. 741). "Hab. Luzon; in the mountains near Baños." Common and widely distributed in the Philippines; endemic.

ILLUSTRATIONS.

PLATE 1. *Desmodium leptopus* A. Gray.
2. *Eucalyptus multiflora* Rich.
3. *Begonia cumingii* A. Gray.
4. *Begonia aequata* A. Gray.



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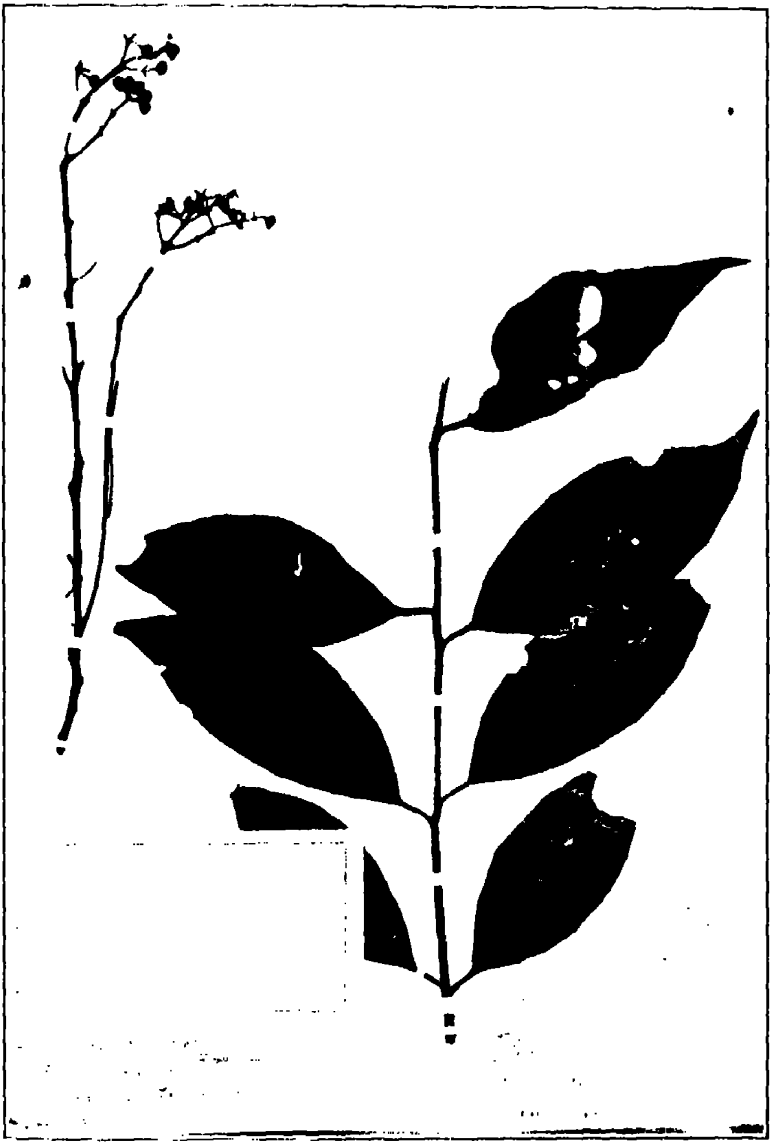

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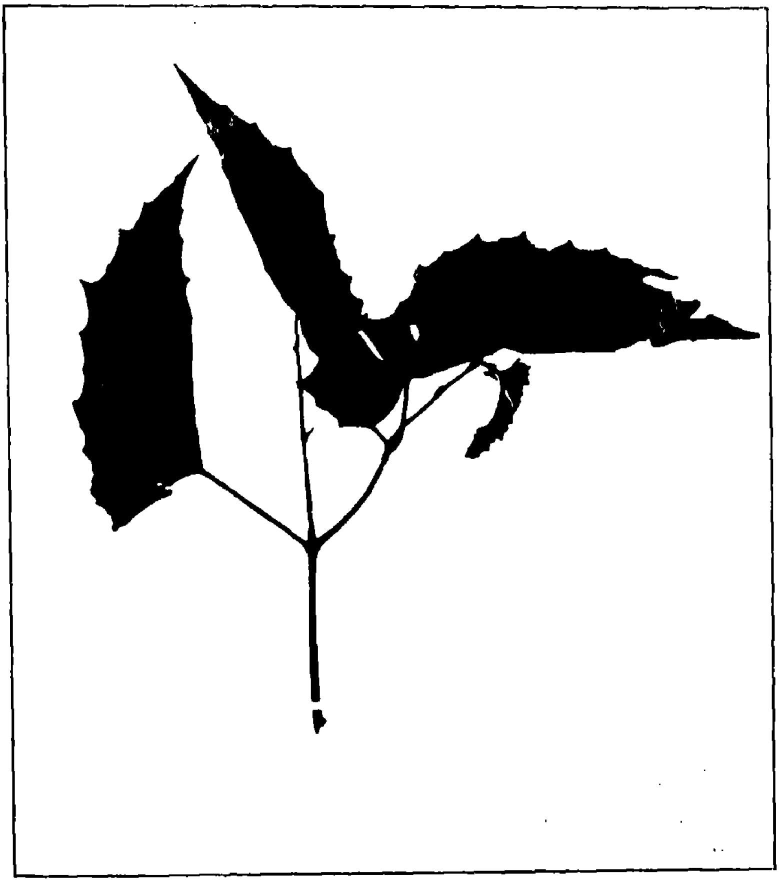

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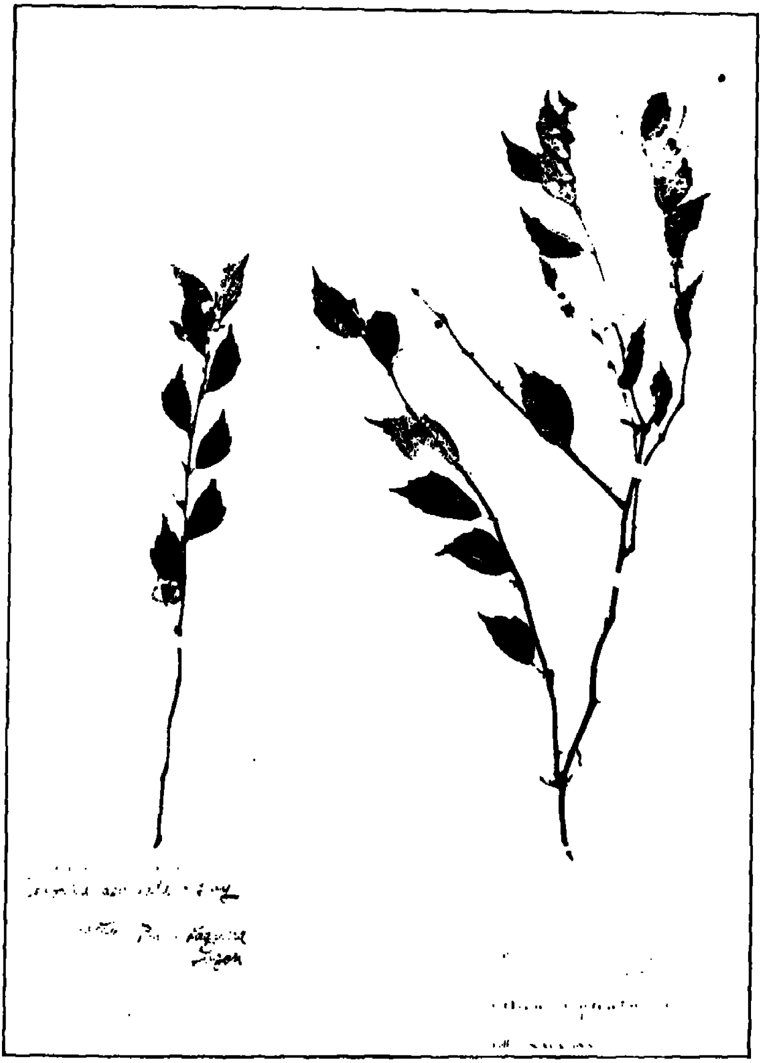

PLATE IV.

INDEX TO PHILIPPINE BOTANICAL LITERATURE, IV.

By Elmer D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

Ames, Oakes. Orchidaceae. Illustrations and Studies of the Family Orchidaceae, issuing from the Ames Botanical Laboratory, North Easton, Massachusetts, fascicle 1 (1905) pp. 1–156; fascicle 2 (1908) pp. 1–288

Of fascicle one, pages 1 to 13 and plates 1 to 3 treat of Philippine orchids, while pages 63 to 107 are occupied by a descriptive list of orchidaceous plants collected in the Philippines by botanists of the United States Government, about 60 species being considered, many of them described for the first time. Fascicle 2, pages 1 to 6 and plates 17 to 19 treat of Philippine orchids, and on plates 21 to 24 eighteen species of Philippine *Dendrochilum* are figured. The greater part of this fascicle is taken up by a paper entitled "Studies in the Orchid Flora of the Philippines," pages 17 to 257, with many figures, about 235 species being considered. This work is by far the most important one that has ever been issued on the Philippine representatives of this family.

Baker, J. G. Handbook of the Fern-Allies: A Synopsis of the Genera and Species of the Natural Orders Equisetaceae, Lycopodiaceae, Selaginellaceae, Rhizocarpeae. (1887) pp. 1–159.

In this work an attempt is made to describe all the species then known of the above orders, the following species being credited to the Philippines: *Lycopodium carinatum* Desv., *L. squarrosum* Forst., *L. filiforme* Roxb., *L. casuarinoides* Spring; *Selaginella auriculata* Spring, *S. commersoniana* Spring, *S. plumosa* Baker, *S. barbata* Spring, *S. cumingiana* Spring, *S. philippina* Spring, *S. involvens* Spring, *S. wallichii* Spring, *S. canaliculata* Spring, *S. willdenovii* Baker, *S. caulescens* Spring, *S. pennula* Spring, *S. pteryphyllos* Spring, *S. intertexta* Spring, *S. myosuroides* Spring; *Marsilea minuta* Linn., and by inference other species of *Lycopodium* and *Selaginella*, also *Psilotum* and *Azolla*.

Bailey, J. W., & Harvey, W. H. Algae in Rept. Wilkes U. S. Exploring Expedition 17 (1862) 155–192.

Six species of algae are recorded from the Philippines, one of which is described as new. Following the paper on algae, the *Diatomaceae* and other microscopic forms are enumerated. For *Diatomaceae* see Harvey & Bailey below.

Benjamin, Ludwig. Neue Gattungen und Arten der Utricularieen nebst einer neuen Eintheilung der Gattung Utricularia. (*Linnaea* 20 (1847) pp. 299–320.)

Three species are described from Cuming's Philippine distribution, *Utricularia brevicaulis*, *U. rosulata*, and *U. heterosepala*. The first however was based on *Cuming 2289*, which was collected in Malacca, not in the Philippines.

Henry, A. The Genus Astilbe. (*Gard. Chron.* III. **32** (1902) pp. 95, 154–156, 171.)

Eleven species are considered, *Astilbe philippinensis* being described from Luzon, as new, the sole representative of the genus in the Philippines, previously confounded with *A. rivularis* Ham.

Jussieu, A. de. Monographie des Malpighiacées. (*Arch. Mus. Paris* **3** (1843) pp. 5–152; 255–616, reprint (1845) pp. 1–368, plates 23.)

Three species are described from Cuming's Philippine collections, *Ryssopteris microstemma* Juss., *R. dealbata* Juss., and *R. cumingiana* Juss.

Kränzlin, Fr. Cyrtandraceae Malayanae insulares novae. (*Journ. Linn. Soc. Bot.* **37** (1906) pp. 275–285.)

In this paper the following Philippines species are described: *Cyrtandra hypochrysea*, *C. macrodiscus*, *C. micrantha*, *C. benguetiana*, and *C. ilicifolia*, all from Luzon.

Lindberg, S. O. Uppställning af familjen Funariaceae. (*Oefv. Vet.-Akad. Förhandl.* **21** (1864) pp. 589–608.)

In an appendix to the above paper three species of Philippine mosses are described from Cuming's collection. *Spiridens longifolius*, *Pterobryum elatum*, and *Trachypus rugosus*.

Loesener, Th. Monographia Aquifoliacearum. (*Nova Acta Acad. Caes. Leopold.-Carol. Nat. Cur.* **78** (1901) pp. VIII+570, *plates 15.*)

Three *genera are recognized*, *Ilex* with 271 *species*, *Nemopanthes* with 1 species, and *Phelline* with 10 species, only the former represented in the Philippines and by the following forms: *Ilex crenata* Thunb., forma *luzonica* (Rolfe) Loes., *I cymosa* Blume (*I. philippinensis* Rolfe), *I. cymosa* var. *cumingiana* (Rolfe) Loes., *I. laurifolia* Zipp., Amboina and ? Philippines, and *I. triflora* Bl., var. *lobbiana* (Rolfe) Loes. *Ilex fletcheri* Merr., has since been described from Mindoro.

Maximowicz, C. J. Revisio Hydrangearum Asiae Orientalis. (*Mém. Acad. Imp. Sci. Pétersb.* VII. **10** (1867) pp. 48, *plates 3.*)

One Philippine species, *Hydrangea lobbii* Max., is described, but erroneously ascribed to Java, the type, *Lobb 446*, having been collected in Luzon, not in Java.

Montagne, C. Plantas cellulares quas in insulis Philippinensibus a cl. Cuming collectas recensuit observationibus non nullis descriptionibusque illustravit. (*Hook. Lond. Journ. Bot.* **3** (1844) pp. 658–662; **4** (1845) pp. 3–11.)

In this paper are enumerated 30 species of Philippine algae of which 4 were described as new; 23 species of lichens, one genus and three species described for the first time; 8 species of *Hepaticae*, one being new; and 14 species of mosses, two being new.

Moore, Albert Hanford. Revision of the Genus Spilanthes. (*Proc. Amer. Acad. Arts and Sci.* **42** (1907) pp. 521–569.)

Of this genus sixty-three species varieties and forms are recognized, of which two are found in the Philippines, *Spilanthes acmella* (L.) Murr., India to southern China and Australia, and *S. grandiflora* Turcz., Philippines and Australia. One Philippine species, *S. ovata* Merr., is not considered. The specimen of Cuming's collection credited to the Philippines under *S. acmella* is from Malacca, not from the Philippines.

Müller, Carl. Musci Indici novi adjectis nonnullis aliis exoticis. (*Linnaea* **37** (1872) pp. 163–182.)

Contains the diagnoses of eight species of Philippine mosses, mostly based on material collected by Gustav Wallis in northern Luzon in 1870.

Müller, Carl. Novitates Bryothecae Müllerianae. (*Linnaea* **38** (1874) pp. 545–572.)

Under "I, Musci Philippinenses," twenty-six species of Philippine mosses are described from the collections of Wallis, Semper and Cuming.

Müller, C. Addimenta ad Synopsin Muscorum nova. (*Bot. Zeit.* **20** (1862) p. 393.)

Contains the descriptions of two species of mosses from the Philippines, *Hypnum lasiomitrium* and *H. fusco-mucronatum*.

Müller, C. Supplementum novum ad Synopsin muscorum. (*Bot. Zeit.* **17** (1859) pp. 246–248.)

Contains the description of *Pilotrichum longifrons* from the Philippines.

Nees ab Esenbach. Gramineae herbarii Lindleyani. (*Hook. Journ. Bot. and Kew Gard. Miscl.* **2** (1850) pp. 97–105.)

About 77 species of grasses are enumerated from the Philippine collections of Hugh Cuming, eleven being described as new. This paper was not available in Manila at the time the author prepared his Enumeration of Philippine Gramineae,[2] and as a consequence a few names that appear in the paper do not occur in the enumeration.

Niedenzu, F. Zur Kenntnis der Gattung Crypteronia Blume. (*Engl. Bot. Jahrb.* **15** (1892) pp. 161–179.)

Five species are recognized, three of which are found in the Philippines, *C. leptostachys* Planch., *C. cumingii* Planch., and *C. paniculata* Blume, the first two being endemic.

Palacky, J. Uebersicht der von Miquel in der Flora Indiae batavae bestimmten Cuming'schen Philippinen-Pflanzen. (*Flora* **43** (1860) pp. 446–448.)

A list of about 225 species compiled from Miquel's Florae Indiae Batavae, being the plants of Cuming's Philippine collection mentioned by Miquel in that work.

Paris, E. G. Index Bryologicus sive enumeratio muscorum hucusque cognitorum adjunctis synonymia distributioneque geographica locupletissimis. (1894) pp. vi+1379 (*Act. Soc. Linn. Burd.*)

An index to the species of mosses published up to 1894, alphabetically arranged by genera and species, with known synonyms and geographical distribution of each species. About 75 species are credited to the Philippines.

Paris, E. G. Index Bryologicus . . . . supplementum primum (1900) pp. 1–234 (*Mém. Herb. Boiss.*).

Supplementary to the preceding, about 25 additional species credited to the Philippines.

Pickering, Charles. The Geographical distribution of Animals and Plants, part 2 (1876) pp. 1–524.

The author was a member of the Wilkes United States Exploring Expedition, and pages 491 to 524 of the above work deal with the Philippines. The expedition was in Philippine waters from January 13, 1842 to February 12, of the same year, stops being made and collecting done at Manila, whence a trip was made inland to Laguna de Bay to Santa Cruz, Majayjay, Mount Banajao, and Los Baños; later visiting Caldera, Mindanao, Jolo and Marongas Islet, and the Mangsee Islands. About 500 species of plants are enumerated from the Philippines, including ferns, but for most part with identifications to the genus or family only. The book ends abruptly at page 524 in the list of Mangsee (Mangsi) plants, and apparently no more was published. Some of the specimens mentioned are not to be found in the United States National Herbarium, the Gray Herbarium nor in the Herbarium of Columbia University. (See Merrill, the Philippine Plants collected by the Wilkes United States Exploring Expedition, *This Journal, Botany*, **3** (1908) 73.)

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[2] *This Journal*, 1 (1906) *Suppl.* 307–392.

Planchon, J. E. Prodromus monographiae ordinis Connaracearum. (*Linnaea* **23** (1850) pp. 409–442.)

Five species are described from the Philippines, all based on material collected by Cuming; *Rourea multiflora*, *R. heterophylla*, *Connarus neurocalyx*, *C. polyanthus*, and *C. obtusifolius*.

Regel, E. Cycas riuminiana Porte. (*Gartenflora* **12** (1863) pp. 16–17.)

The above Philippine species is figured and described.

Robinson, C. B. Some Features of the Mountain Flora of the Philippines. (*Journ. N. Y. Bot. Gard.* **8** (1907) pp. 113–117.)

A general discussion of the highland flora of the Philippines and some of its affinities, the following northern types being credited to Luzon for the first time, *Boenninghausenia albiflora* Reichb. f., *Thesium psilotoides* Hance, *Anaphalis adnata* DC., and *A. contorta* Hook. f.

Robinson, C. B. Ipomoea triloba L. in the Philippines. (*Torreya* **7** (1897) pp. 78–80.)

The above Linnean species, a native of tropical America is credited to the Philippines as an introduced plant, and to it is reduced *Ipomoea blancoi* Choisy, based on *Convolvulus dentatus* Blanco, non Vahl. Distribution, synonymy and citation of specimens are given.

Rolfe, R. A. Donax and Schumannianthus. (*Journ. Bot.* **45** (1907) pp. 242–244.)

Three species of *Donax* and two of *Schumannianthus* are considered and full synonymy is given, one species only extending to the Philippines, *Donax cannaeformis* (Forst. f.) Rolfe, to which must be referred *Maranta arundinacea* Blanco, non Linn., *M. dichotoma* Naves, non Wall., *Clinogyne grandis* Vidal, and numerous Philippine specimens referred to *Donax arundastrum* Lour., which species was erroneously interpreted by Schumann, and does not extend to the Philippines.

Schmidle, W. Einige neue Algen aus Java und den Philippinen (gesammelt von A. Usteri, Zürich). (*Hedwigia* **43** (1904) pp. 414–415.)

Four species are described, one from Java, one from Labuan, and the following from the Philippines, *Phormidium usterii* and *Myxobactron usterianum*. The same species appear again with short descriptions, the latter with a figure, in Usteri *Beiträge Kennt. Philip. und ihrer Vegetation* (1905) pp. 136–139, several other species of Philippine *Algae* being also enumerated in the latter place.

Schulz, O. E. Erythroxylaceae. (*Das Pflanzenreich* **29** (1907) pp. 1–176.)

In this monograph of the family two genera are recognized, *Erythroxylum* P. Br., and *Aneulophus* Benth., the former with 193 species, widely distributed in the tropics of the world, and the latter monotypic and African. *Erythroxylum* is represented in the Philippines by a single species, *E. cuneatum* (Wall.) Kurz (*E. burmanicum* Griff.), extending from British India to the Malayan Peninsula, Sumatra, Java, and Luzon.

Seemann, Berthold. Revision of the Natural Order Hederaceae, being a Reprint with Numerous Additions and Corrections of a series of Papers Published in the "Journal of Botany" British and Foreign. (1868) pp. 1–107, plates 7.

Heptapleurum insularum and *H. cumingii* are described from the Philippines and three or four other species are mentioned from the Archipelago, *Nothopanax cumingii* Seem., *Polyscias nodosa* Seem., *Aralia hypoleuca* Presl, and *Osmoxylon cumingii* Seem., the latter being a nomen nudum and a synonym of *Boerlagiodendron trilobatum* Merr. (*Cuming 754.*)

Spring, A. Monographie de la famille des Lycopodiacées. (*Mém. Acad. Brux.* **15** (1842) pp. 1–110; **24** (1850) pp. 1–358.)

Of *Lycopodium* 101 species are recognized and of *Selaginella* 209 species, the following being credited to the Philippines: *Lycopodium ulicifolium* Vent., *L. laxum* Presl, *L. phlegmaria* var. *longifolium* Spring, and *L. cernuum* L.; *Selaginella involvens* Spring, *S. tamariscina* Spring, *S. philippina* Spring, *S. auriculata* Spring, *S. commersoniana* Spring, *S. cupressina* Spring, *S. cumingiana* Spring, *S. laevigata* Spring, *S. pouzolziana* Spring, *S. wallichii* Spring, *S. caulescens* Spring, *S. pennula* Spring, *S. presliana* Spring, *S. flabellata* Spring, *S. geniculata* Spring, *S. myosuroides* Spring, *S. intertexta* Spring, *S. belangeri* Spring, *S. aristata* Spring, *Psilotum complanatum* Sw., and *P. capillare* Blume.

Stapf, Otto. Hallieracantha, a New Genus of Acanthaceae. (*Journ. Linn. Soc. Bot.* **38** (1907) pp. 6–17.)

The above genus of *Acanthaceae* is described, 19 species being considered, all Bornean except one, *H. philippinensis*, which is described from material collected at Zamboanga, Mindanao.

Sullivant, W. S. United States Exploring Expedition . . . under the command of Charles Wilkes, U. S. N. Botany, Musci. (1859) pp. 32, plates, 26, imperial folio.

This paper really forms the first part of Volume 17 of the Wilkes Expedition reports, but was published separately by the author. It contains the descriptions of two species of Philippine mosses, *Hypnum calderense* and *Neckera phyllogonioides*, while *Hypnum albescens* Schw. is credited to the Archipelago. The diagnoses of the new species were published previously under the title "Notices of some New Mosses in the Collection of the United States Exploring Expedition under Captain Wilkes. (*Proc. Am. Acad.* **3** (1857) pp. 181–185.)

Taubert, P. Zur Kenntnis der Arten der Gattung Stenomeris Planch. (*Engl. Bot. Jahrb.* **18** (1893) *Beibl.* 38, p. 2.)

Three species are recognized, *S. dioscoreaefolia* Planch., *S. wallisii* Taub., and *S. Cumingiana* Becc., all from the Philippines.

United States Exploring Expedition during the years 1838–1842 under the command of Charles Wilkes, U. S. N., Botany, Vascular Cryptogams, Vol. 17.

The first part of this volume was published in 1859 and contains the mosses by *Sullivant*, see above. In 1862 other parts were published. In the paper on lichens by Tuckerman no Philippine forms are recorded. For *Algae* and *Diatomaceae* see Bailey and Harvey above, and for Fungi see Curtiss & Berkeley above. (See Merrill, The Philippine Plants Collected by the Wilkes Expedition, *This Journal*, **3** *Botany* (1908) 73.)

Valeton, Th. Kritisch Overzicht der Olacineae. (1886) pp. 1–280, *plates* 6.

About three species are mentioned as extending to the Philippines, but no new species or names appear so far as the Philippine flora is concerned.

Warnstorf, C. Beiträge zur Kenntniss exotischer und europäischer Torfmoose. (*Bot. Centralblatt* **76** (1898) pp. 380–390.)

Contains the description of one Philippine species, *Sphagnum luzonense* Warnst., from northern Luzon, collected by *A. Loher.*

Van Tieghem, Ph. Sur les Loxanthera, Amylotheca et Treubella, trois genres nouveaux pour la tribu des Élytranthées dans la famille des Loranthacées. (*Bull. Soc. Bot. France* **41** (1894) pp. 257–260.)

One Philippine species, *Amylotheca cumingii,* based on *Cuming 1969* is partially described.

Van Tieghem, Ph. Quelques genres nouveaux pour la tribu des Loranthées dans la famille des Loranthacées. (l. c. pp. 481–490.)

Lanthorus spicifer Presl is noted from the Philippines and *L. cumingii* is partially described, the latter based on *Cuming 1975,* the former on *Cuming 1949.*

Van Tieghem, Ph. Sur la groupement des espèces des genres dans les Loranthacées a calice dialysépale et anthères basifixes. (l. c. pp. 497–511.)

Stemmatophyllum luzonense (*Loranthus,* Presl), *S. cumingii* based on *Cuming 1966, S. sessilifolium, Cuming 1956,* and *S. nodosum, Cuming 1952, 1958,* from the Philippines, are partially described.

Van Tieghem, Ph. Quelques compléments a l'étude des Loranthées a calice dialysépale et anthères basifixes, ou Phénicanthémées. (l. c. pp. 553–552.)

Stemmatophyllum acutum, based on *Cuming 1973* from the Philippines, is partially described.

Van Tieghem, Ph. Sur la groupement des espèces en genres dans Loranthées a calice gamosépale et anthères basifixes, ou Dentrophthcées. (l. c. **42** (1895) pp. 241–272.)

One new species appears from the Philippines, *Candollina barthei,* and three new combinations, *Cichlanthus philippensis* (*Loranthus* Cham.), *Candollina haenkeana* (*Loranthus* Presl) and *C. malifolia* (*Loranthus* Presl).

THE PHILIPPINE

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NOTES ON PHILIPPINE BOTANY.

By ELMER D. MERRILL and R. A. ROLFE.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.; and from the Kew Herbarium, London, England.)

The following paper was in greater part written at Kew, in November and December, 1907, while Mr. Merrill was at the Kew Herbarium studying the types of Philippine plants preserved there, and comparing the recently collected material with the rich Philippine collections, and the very extensive series of Indo-Malayan and Chinese plants preserved at Kew. Through the kindness of Lieutenant-Colonel D. Prain, Director of the Royal Gardens, Kew, Mr. R. A. Rolfe, assistant in charge of the Philippine collections in the Herbarium, was allowed to assist at this work during a part of each day. The Kew Herbarium contains more than 25,000 specimens of Philippine plants alone, including the duplicate material forwarded by the Bureau of Science, which is by far the largest collection of Philippine plants extant, with the exception of that of the Bureau of Science.

A number of species were encountered during the progress of the work, which had apparently not been hitherto described, the descriptions of many of these being included in the following paper. Various species previously described from other regions were found in the material examined, and whenever these species had not been reported from the Philippines, they have been included. A certain number of errors were met with in the work of the several botanists who have published papers on the Philippine flora, and whenever possible, these have been corrected;

other evident errors will need to be considered at a later date when more complete material is available for study. Mr. J. R. Drummond kindly examined critically the material in *Cruciferae* and a part of that in *Compositae*, and his notes are included in the present paper, each note being followed by his initials.

Sixteen species are described as new, and no less than fourteen genera, previously unknown from the Philippines, are recorded for the first time, while approximately fifty species, previously described by various authors from extra-Philippine regions are here first credited to the Archipelago.

HYDROCHARITACEÆ.

HYDRILLA Richard.

Hydrilla verticillata (L.f.) Royle Ill. Bot. Himal. (1839) *t. 376;* Presl Bemerk. (1844) 112; Casp. in Pringsh. Jahrb. 1 (1858) 494; Hook. f. Fl. Brit. Ind. 5 (1888) 659; C. H. Wright ex Forbes & Hemsl. in Journ. Linn. Soc. Bot. 36 (1903) 1; Naves Nov. App. (1883) 214.

Serpicula verticillata Linn. f. Suppl. (1781) 416; Roxb. Pl. Coromandel 2 (1798) *t. 164.*

LUZON, Province of Tayabas, *Whitford 830:* Province of Rizal, *Loher 1592.* MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens.*

Previously enumerated from the Philippines by Naves but as so many of his records are erroneous, it has been thought best again to enumerate the species from the Archipelago.

Central Europe through tropical Asia to Australia and the Mascarene Islands.

LILIACEÆ.

SMILAX Tourn.

Smilax leucophylla Blume Enum. Pl. Jav. 1 (1830) 18; A. DC. Monog. Phan. 1 (1878) 200; Naves Nov. App. (1883) 263.

Smilax vicaria Kunth Enum. 5 (1850) 262; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 35.

Smilax latifolia Blanco Fl. Filip. ed. 2 (1845) 548; ed. 3, 3:204, non R. Br.

Smilax macrophylla Naves Nov. App. (1883) 262, non Roxb.

LUZON, Province of Bataan, Mount Mariveles, *Merrill 3771:* Province of Rizal, *Merrill 1713; For. Bur. 1877 Ahern's collector; Loher 1923, 1934.*

Smilax vicaria Kunth was based on Blanco's description of *S. latifolia*, non R. Br., the specimens cited above agreeing with Blanco's description. At the same time they seem to agree in all essential characters with authentically named *S. leucophylla* Blume in Herb. Kew, and accordingly Kunth's species is here reduced, it previously having been considered a doubtful one.

Java, Borneo and (?) the Malay Peninsula.

ASPARAGUS Linn.

Asparagus lucidus Lindl. Bot. Reg. 30 (1844) Miscel. 20, no. 36; Baker in Journ. Linn. Soc. Bot. 14 (1875) 605.

Var. dolichocladus Merrill & Rolfe var. nov.

Differing from the typical form in its short pedicels, which do not exceed 1.5 mm in length, and in its phylloclades, some of which are 4.5

cm long, most of them, however, varying from 1 to 2.5 cm in length, the axillary spines nearly straight, 5 to 7 mm long.

LUZON, Province of Benguet, Tilad, *Loher 1928*, distributed as *A. racemosus*.

The genus is new to the Philippines, the species extending from Japan and Korea to Formosa and southern China.

CARYOPHYLLACEÆ.

ARENARIA Linn.

Arenaria serpyllifolia Linn. Sp. Pl. (1753) 423; DC. Prodr. **1** (1824) 411; Edgw. in Hook. f. Fl. Brit. Ind. **1** (1874) 239; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1886) 70.

LUZON, Province of Benguet, Loo, *Loher 1621*.

A widely distributed species in temperate and subtemperate regions, the first representative of the genus to be found in the Philippines, apparently indigenous.

SAGINA Linn.

Sagina procumbens Linn. Sp. Pl. (1753) 128; Edgw. in Hook. f. Fl. Brit. Ind. **1** (1874) 242.

LUZON, Province of Benguet, *Loher 1622*.

Widely distributed in the north and south temperate zones, in Asia southward to western Tibet and Sikkim; the first representative of the genus to be found in the Philippines.

POLYGONACEÆ.

POLYGONUM Linn.

Polygonum alatum Hamilt. in D. Don Prodr. Fl. Nepal. (1823) 72; Hook. f. Fl. Brit. Ind. **5** (1886) 39; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1891) 340.

Polygonum nepalense Meisn. in DC. Prodr. **14** (1856) 128.

LUZON, Province of Benguet, *Loher 5207*.

Afghanistan to Ceylon, China, Japan and the Malay Archipelago; new to the Philippines.

Polygonum glabrum Willd. Sp. Pl. **2** (1799) 447; Meisn. in DC. Prodr. **14** (1856) 114; Hook. f. Fl. Brit. Ind. **5** (1886) 34; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1891) 340.

LUZON, Province of Benguet, *Elmer 5970; Loher 4594*.

Tropical and subtropical regions of Asia, Africa and America; new to the Philippines.

Polygonum Hydropiper Linn. Sp. Pl. (1753) 361; Meisn. in DC. Prodr. **14** (1856) 109; Hook. f. Fl. Brit. Ind. **5** (1886) 39; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1891) 340; Walp. in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 407.

LUZON, *Meyen* in Herb. Berol.; Province of Benguet, Kabayan, *Merrill 4428*, October, 1905.

Western Europe and northern Africa to China, Japan, and Java, also in North America.

Walpers' identification of Meyen's specimen appears to be correct, it having been examined in the Berlin Herbarium in January, 1908, but the specimen collected by Meyen in Luzon, and reported by Walpers l. c. as *Polygonum Persicaria* Linn., is not that species, but *P. barbatum* Linn.

Polygonum praetermissum Hook. f. Fl. Brit. Ind. **5** (1886) 47; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1891) 347.

LUZON, Province of Benguet, *Loher 4598;* District of Lepanto, Mount Data, *Merrill 4521.*

Eastern India and Ceylon to central China, also in Tasmania; new to the Philippines.

Polygonum Posumbu Hamilt. in D. Don Prodr. Fl. Nepal. (1823) 71; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1891) 346.

LUZON, Province of Benguet, *Merrill 4805; Elmer 5776; Williams 1450.*

Eastern Himalayan region to China, Japan, Formosa and Java; new to the Philippines.

RANUNCULACEÆ.

CLEMATIS Linn.

Clematis Meyeniana Walp. in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 297; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1886) **5**; Hook. f. in Curtiss' Bot. Mag. III. **59** (1903) *pl. 7897.*

LUZON, Province of Benguet, *Loher:* Suyoc to Pauai, *Merrill 4777,* November, 1906, *alt.* 2,000 *m.*

A species extending from southern China to the Riu Kiu Islands and Formosa, not previously reported from the Philippines.

NARAVELIA DC.

Naravelia Loheri Merrill & Rolfe sp. nov.

Scandens; foliis oppositis, petiolatis, integris, membranaceis, acuminatis, basi 5-nerviis; floribus solitariis, terminalibus, longe pedunculatis; sepalis 4, ovatis; petalis circiter 12, lineari-spatulatis, circiter 2 cm longis, 2 mm latis; ovario villosissimo; achenis lanceolatis, plus minus hirsutis, 2 cm longis, ecaudatis.

Scandent, the stems slender, reddish or straw colored, striate, sparingly pilose, becoming nearly glabrous, the young shoots rather densely ferruginous-pubescent. Leaves opposite, the petiole about 2 cm long, slightly pilose or pubescent; leaflets 2, ovate or oblong-ovate, membranous, glabrous or nearly so, entire or rarely with one or two large or small teeth, base rounded or acute, apex acuminate and tipped with a small mucro, 5 to 8 cm long, 2.5 to 4.5 cm wide; nerves 5, basal, prominent, ascending, the reticulations lax, rather prominent; petiolules 1 cm long or less, usually densely pubescent, the tendril elongated, slender, glabrous, 3-partite at the apex. Flowers few, solitary, at the apices of the lateral branches, the peduncles 4 cm long or more, somewhat pubescent, elongated in fruit. Sepals 4, 8 to 9 mm long, ovate, somewhat pubescent, deciduous. Petals about 12, linear-spatulate, glabrous, 2 cm long, or less, 2 mm wide above. Stamens about 3 mm long. Carpels densely hirsute. Achenes 10 to 15, about 2 cm long, narrowly lanceolate, appressed-hirsute but not densely so, gradually narrowed above to a slender beak, not tailed.

LUZON, Province of Rizal, Novaliches, *Loher 6*, May 25, 1890.

A most characteristic species, at once recognizable by its solitary long-pedicelled flowers and tailless achenes.

ANEMONE Linn.

Anemone vitifolia Buch.-Ham. in DC. Prodr. **1** (1818) 210; Hook. f. et Thoms. in Hook. f. Fl. Brit. Ind. **1** (1872) 8; Diels in Engl. Jahrb. **19** (1900) 330; M. Smith in Journ. Linn. Soc. Bot. **36** (1905) 450.

Anemone luzoniensis Rolfe ex Hayata in Bot. Mag. Tokyo **20** (1906) 73, *nomen*.

LUZON, Province of Benguet, *Vidal 1356; Williams 1272; Elmer 6250; Merrill 4787:* District of Lepanto, Mount Data, *Loher 1*.

Himalayan region to central and southern China and Formosa; an interesting example of the eastern extension of the Himalayan flora to the high table-land of northern Luzon.

RANUNCULUS Linn.

Ranunculus philippinensis Merrill & Rolfe sp. nov.

Caespitosus, plus minus hirsutus, usque ad 15 cm altus; foliis tripartitis, 1.5 ad 2 cm longis, segmentis trifidis, acutis; floribus terminalibus, solitariis, luteis, 1.5 cm diam., petalis oblongo-obovatis, obtusis; acheniis 6 ad 15, compressiusculis, in capitula globosa aggregatis, glabris, punctatis; stylo uncinato persistente.

A tufted, acaulescent species with erect 1-flowered scapes, but under some conditions stoloniferous. Petioles 3 to 15 cm long, erect, with scattered appressed hairs which are more numerous below. Leaves trifoliolate, 1.5 to 2 cm long with scattered appressed or spreading long white hairs on both surfaces, the leaf-segments 1.5 cm long or less, the middle one longer petioluled than the lateral ones, each segment cut into three, rarely more, ovate, acute lobes, the sinus very narrow, acute. Pedicels erect, somewhat appressed-hirsute, 4 to 15 cm long, 1-flowered. Flowers yellow, 1.5 cm in diameter. Sepals membranous, oblong-ovate, with few long hairs outside, about 5 mm long. Petals 5, oblong-obovate, apex rounded, narrowed at the base, about 8 mm long, 4 mm wide. Filaments nearly 3 mm long; anthers 1.5 mm long. Achenes 6 to 15 in globose heads, compressed, glabrous, punctate, 3.5 mm long, 2 mm wide, terminated by a somewhat curved beak about 1 mm long.

LUZON, District of Lepanto, Mount Data, *Merrill 4508, 4570*, November, 1905; *Loher 10*, February, 1894: Province of Benguet, Panai, *Merrill 4750*, November, 1905; *Loher 11*, February, 1894.

In mossy forests and in swamps above 2,250 m alt., the genus new to the Philippines.

A most interesting species, which strangely enough does not have its closest allies to the north and west, but in the southeast in Queensland and New Zealand. It is in fact so closely allied to the Australian *Ranunculus lappaceus* Sm., that it is difficult to distinguish the Philippine plant from some forms of the Australian species. However, *Ranunculus philippinensis* is smaller than typical *R. lappaceus*, is much more hirsute than the latter, and has much fewer achenes, minor characters it is true, but which with geographical distribution may sufficiently distinguish the Philippine form, although it might be better to consider the Luzon plant simply as a variety of the Australian species.

MAGNOLIACEÆ.

MICHELIA *Linn.*

Michelia Cumingii Merrill & Rolfe nom. nov.

Michelia parviflora Merr. in Govt. Lab. Publ. (Philip.) **35** (1906) 70; Philip. Journ. Sci. **1** (1906) Suppl. 53: non Rumph. in DC. Reg. Veg. Syst. Nat. **1** (1818) 449; Delessert Icon. Select. Plant. **1** (1820) 22, *tab. 85*. (In Index Kewensis, by error, Rumphius' species is listed as *M. parvifolia*.)

LUZON, Province of Tayabas, *Cuming 783:* Province of Rizal (Morong), *Vidal 2040, 2043;* Bosoboso, *Merrill 2681; For. Bur. 2155, 3202 Ahern's collector:* Province of Bataan, *Borden:* Province of Benguet, *Loher 5200, 5201.*

An endemic species, not uncommon in Luzon.

CRUCIFERÆ.

CARDAMINE Linn.

Cardamine Regeliana Miq. Ann. Mus. Bot. Lugd.-Bat. **2** (1865) 73.

Cardamine parviflora Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 194, non *Linn.*

LUZON, Province of Benguet, *Loher 2026;* Baguio, *Elmer 5846:* District of Lepanto, Balili, *Merrill 4609*, November, 1905.

These specimens are undoubtedly *Cardamine Regeliana* Miq., which is widely distributed in eastern Asia, from the neighborhood of Behring's Straits through Japan, Korea, China, the Philippines, and the Malay Archipelago.

Chinese examples have been referred as subspecies *flexuosa* to *Cardamine hirsuta* Linn., but the true *C. hirsuta* of Linnæus does not appear to reach eastern Asia. The plant intended as subspecies *flexuosa* is presumably *C. sylvatica* Link, to which the type of Miquel's species is no doubt very close, but it seems advisable to follow Miquel in keeping *C. Regeliana*, for the present at least, separate. Regel, who had not seen specimens of the North American *C. angulata* Hook., referred Kamtschatkan specimens of *C. Regeliana* to the North American species, but erroneously. By Maximowicz it appears to have been distributed as *C. sylvatica* var. *kamschatica* and there seems little doubt that the forms placed at St. Petersburg under this name, from Japan, etc., are referred correctly to the same species as the small form from Kamtschatka, although the latter is of dwarf habit and depauperated. If the six-anthered form with large pinnæ to the leaves, from southern Europe, be regarded as embracing *C. Regeliana*, then the specific name would be *C. sylvatica*, for although Hudson's *C. flexuosa* has priority, it seems very questionable if the plant he had in view was true *C. sylvatica*. (J. R. D.)

Cardamine sp.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4624 Mearns & Hutchinson.*

This may be a new species, but it is very near *Arabis heterophylla* var. *a* Forster in Herb. Kew, which is not the same as *Cardamine heterophylla* Hook. in Ic. Plant. 58 and Journ. Bot. 2:404. The plant of the Icones is a form and near the southern coasts of Australia and in Tasmania, which appears to be the same as *Cardamine debilis* Banks & Solander, and this may not improbably have been Forster's typical *Sisymbrium heterophyllum*, but the Mindanao form differs from the Tasmanian (*Gunn 466*) in the size of the flowers and otherwise. It does not appear where Forster's var. α was met with, but the probability is that it was in New Zealand. The material is hardly sufficient to warrant the establishment of a new species, even if the plant discovered on Mount Malindang by Mearns & Hutchinson be identical with Forster's single gathering. (J. R. D.)

CAPPARIDACEÆ.

CAPPARIS Linn.

Capparis Cumingii Merrill & Rolfe sp. nov.

Scandens, glabra; spinis nullis vel minutis; foliis oblongis, subcoriaceis, usque ad 11 cm longis, basi rotundatis, apice breviter et late acuminatis, nervis utrinque 7 vel 8; paniculis terminalibus, floribus ad apices ramulorum subumbellatis dispositis; baccis globosis.

Scandent, glabrous throughout. Branches terete, at least the upper portions spineless, the panicle-branches sometimes subtended by two small spines. Leaves oblong, coriaceous, 9 to 11 cm long, 3 to 5 cm wide, the base rounded, the apex short, broadly acuminate; nerves 7 or 8 on each side of the midrib; petioles 2 to 2.5 cm long. Inflorescence a terminal panicle about 20 cm long, the primary branches stout, spreading, the lower ones 5 to 7 cm long, the flowers subumbellately disposed at the ends of the branches, 3 to 10 flowers on each branchlet, their pedicels 1 to 2.5 cm long. Buds globose. Flowers rather large. Sepals 4, concave, imbricate, ovate, rounded, 1 cm long or less. Petals obovate or oblong, 2 cm long or less. Stamens indefinite, their filaments 2.5 cm long; the stipe to the ovary 3 to 3.5 cm long. Fruit globose, glabrous, 2 cm in diameter, the pedicel thickened above.

LUZON, Province of Albay, *Cuming 1234*.

A characteristic species, distinguishable by its oblong subcoriaceous leaves and terminal panicles of rather large flowers, the flowers being long-pedicelled and fascicled at the ends of the branches.

CUNONIACEÆ.

SPIRAEOPSIS Miq.

Spiraeopsis celebica Miq. Fl. Ind. Bat. 1^1 (1857) 719; Ceron Cat. Pl. Herb. (1892) 57.

LUZON, Province of Camarines Sur, Mount Isarog, *Vidal 2710*, in Herb. Kew.

This monotypic genus is, so far as is known, confined to Celebes and Luzon, and has previously been credited to the Philippines in the rather obscure "Catálogo de las Plantas del Herbario," published in Manila in 1892. In view of its special interest in adding a species belonging to a monotypic genus to the already long list known only from Celebes and the Philippines, it is again enumerated here.

ROSACEÆ.

ERIOBOTRYA Lindley.

Eriobotrya oblongifolia Merrill & Rolfe sp. nov.

Glabra, inflorescentiis exceptis; foliis oblongis vel oblongo-lanceolatis, crasse coriaceis, usque ad 10 cm longis, apice et basi acutis vel acuminatis, margine minute crenulatis; paniculis thyrsoideis, dense ferrugineo-tomentosis, 5 cm longis; ovarium 5-loculare; styli 4 vel 5.

A tree, glabrous throughout except the inflorescence. Branches reddish-brown, glabrous, rugose when dry. Leaves 7 to 10 cm long, 1.5 to 2.5 cm wide, coriaceous, shining, the apex short and sharply acuminate or subacute, narrowed below to the acute or slightly decurrent-acuminate base, the margins minutely crenate; nerves numerous and with the reticulations rather distinct on the lower surface; petioles 1 to 1.5 cm long. Panicles terminal, thyrsiform, 5 cm long or less, densely ferruginous-tomentose. Flowers about 1 cm in diameter, white. Calyx ferruginous-tomentose, funnel-shaped, about 4 mm long, the lobes broad, acute, about 1.5 mm long. Petals imbricate, broadly ovate, rounded, 5 mm long. Filaments 3 mm long or less, glabrous; anthers broad, 1 mm long. Ovary 5-celled, each cell 2-ovuled; styles 4 or 5, 3.5 to 4 mm long, united for the lower 1.5 mm. Fruit ovoid, red, black when dry, 5 mm long, glabrous. Seeds 5, 4 mm long, strongly 3-angled.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4680 Mearns & Hutchinson*, May, 1906, in forests at 1,800 m altitude.

LEGUMINOSÆ.

DESMODIUM Desv.

Desmodium Bolsteri Merrill & Rolfe sp. nov. § *Dollinera.*

Frutex 1 m altus; foliis trifoliolatis, foliolis oblongo-obovatis, usque ad 4 cm longis, apice rotundatis, retusis, subtus leviter appresse pilosis; racemis paniculatis, terminalibus; leguminibus 4-articulatis, 2.5 cm longis, glabris vel leviter pilosis.

A shrub about 1 m high with trifoliolate leaves, the leaflets oblong-obovate, 4 cm long or less, the pods 4-jointed, about 2.5 cm long, 5 mm wide. Branches reddish-brown, terete, glabrous, lenticellate. Leaves somewhat crowded on the younger branches, the branchlets somewhat appressed-pilose and with numerous linear-acuminate stipules about 8 mm long, usually appressed. Petioles 1 cm long or less, slightly pilose, the leaflets slightly appressed-pilose beneath, the base acute, the apex rounded, retuse, submembranous, the nerves 5 or 6 on each side of the midrib, obscure, the terminal leaflet about 4 cm long, 12 mm wide, its petiolule 5 mm long, the lateral leaflets similar but smaller, their petiolules about 1 mm long. Inflorescence terminal, lax, 3–4 cm long, few-flowered, the pedicels (in fruit) spreading, 7 to 8 mm long, slender. Flowers unknown. Pods 4-jointed, about 2.5 cm long, 5 mm wide, thin, slightly pilose, the basal joint abruptly contracted into a slender pedicel, the terminal joint apiculate.

LUZON, Province of Cagayan, Peña Blanca, *F. H. Bolster 181*, October 7, 1905, on boulders along the river at an altitude of about 150 m.

Desmodium virgatum Zoll. Nat. Geneesk. Arch. **3** (1846) 58; Prain in Journ. As. Soc. Beng. **66^2** (1897) 143.

LUZON, *Vidal 248; Loher 2348, 2349; Bur. Sci. 4 Foxworthy; For. Bur. 2231 Meyer.* PALAWAN, *Bur. Sci. 194 Bermejos.*

Burma to Perak and Java; new to the Philippines.

Desmodium gyroides DC. Mém. Leg. (1825) 322; Prodr. **2** (1825) 326; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 175.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 269*, July, 1906.

British India to Indo-China, the Malay Peninsula and Archipelago; new to the Philippines.

FLEMINGIA Roxb.

Flemingia philippinensis Merrill & Rolfe sp. nov.

Suffruticosa, prostrata; foliis trifoliolatis, foliolis subsessilibus, coriaceis, dense et valde reticulatis, leviter pilosis, 4 ad 6 cm longis, apice rotundatis; racemis axillaribus, solitariis, congestis, 2 ad 2.5 cm longis; floribus 8 mm longis, calycis lobis valde inaequalibus; leguminibus 7 mm longis, pubescentibus, turgidis; seminibus globosis.

A suffrutescent perennial from a stout woody root, the branches prostrate, trailing, the leaves trifoliolate, the leaflets densely and strongly reticulate, somewhat pilose on both surfaces, coriaceous, rounded at the apex, the inflorescence a dense axillary solitary raceme 2 to 2.5 cm long, the bracts lanceolate, the lower lobe of the calyx much exceeding the others. Branches prostrate, terete or somewhat angular, appressed-pilose, in age nearly glabrous. Petioles stout, 1 to 2 cm long, flattened above, somewhat pilose; leaflets subsessile, nearly equal, coriaceous, densely and strongly reticulate, oblong, entire, inequilateral at the base, rounded at the apex, 4 to 6 cm long, 1.5 to 3 cm wide. Flowers about 8 mm long, the calyx densely appressed-pilose, the lobes lanceolate, acuminate, the lowest one much exceeding the others. Corolla pink or pale-purple, the standard about 6 mm long. Pod 7 mm long, 3 mm wide, turgid, somewhat pubescent, 1- or 2-seeded, the pedicels about 3 mm long, the calyx persistent. Seeds black, smooth, globose.

LUZON, District of Lepanto, Cervantes to Mancayan, *Merrill 4460*, November, 1905, in open grass-covered slopes. Allied to *Flemingia congesta* but abundantly distinct.

MILLETTIA Wight & Arn.

Millettia Ahernii Merrill & Rolfe sp. nov.

Arbor parva, glabra; foliis imparipinnatis, 3- vel 4-jugatis, circiter 25 cm longis; foliolis glabris, supra nitidis, elliptico-ovatis vel elliptico-oblongis, basi acutis, apice acuminatis, subcoriaceis, 8 ad 9 cm longis, 3 ad 4.5 cm latis, nervis utrinque 8; leguminibus lanceolatis, crassis, planis, 18 ad 20 cm longis, 2 ad 2.5 cm latis.

A tree, glabrous throughout, (inflorescence unknown). Branches terete, glabrous, light-grayish-brown, lenticellate. Leaves about 25 cm long, odd pinnate, 3- or 4-jugate, the rachis about 15 cm long; leaflets elliptical-ovate to elliptical-oblong, 8 to 9 cm long, 3 to 4.5 cm wide, subcoriaceous, somewhat shining, paler beneath, entire, base acute, apex short-acuminate, the acumen blunt; nerves about 8 on each side of the midrib, not prominent, the reticulations rather obscure; petiolules 5 mm long. Inflorescence terminal. Pods lanceolate, 18 to 20 cm long, 2 to 2.5 cm wide, thick, woody, glabrous, flattened, somewhat narrowed at the base, the apex acute, sometimes slightly curved.

LUZON, Province of Rizal, *Bosoboso, For. Bur. 3373 Ahern's collector*, September, 1905.

A species allied to *Millettia Merrillii* Perk., differing from that species in its larger leaves and very much larger and more woody pods.

PITHECOLOBIUM Mart.

Pithecolobium ellipticum (Blume) Hassk. in Retzia **1** (1855) 225; Prain in Journ. As. Soc. Beng. **66**² (1897) 270.

Inga elliptica Blume Cat. Gew. Buitenz. (1823) 88; Walp. Repert. **1** (1842) 930.

Pithecolobium fasciculatum Benth. in Hook. Lond. Journ. Bot. **3** (1844) 208 ?; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 304.

PALAWAN, *For. Bur. 4144 Curran*.

Malay Peninsula and Archipelago; new to the Philippines and here recorded from the Archipelago for the first time, and under its oldest specific name as shown by Prain l. c.

LESPEDEZA Michx.

Lespedeza juncea Pers. var. **sericea** (Thunb.) Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1887) 181.

Hedysarum sericeum Thunb. Fl. Jap. (1784) 287.

Lespedeza sericea Miq. Ann. Mus. Bot. Lugd.-Bat. **3** (1867) 49.

LUZON, Province of Benguet. *Loher 2336*, February, 1894.

Northern India to China, Japan, Formosa, and also in Australia; the genus new to the Philippines.

SIMARUBACEÆ.

BRUCEA J. S. Mill.

Brucea mollis Wall. Cat. (1828) no. 8483; Benn. in Hook. f. Fl. Brit. Ind. **1** (1875) 521.

Brucea luzoniensis Vidal Sinopsis Atlas (1883) 19, *t. 26, f. B.;* Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 70.

After an examination of a full series of the Luzon form, and comparison with the Indian material at Kew, we are of the opinion that *Brucea luzoniensis* Vidal, although sufficiently distinct from *B. sumatrana* Roxb., can not be maintained as a species distinct from *B. mollis*. The type of Vidal's species is no longer extant, and the species is not represented in his Philippine collection at Kew, although it was secured by Loher.

Himalaya and Silhet.

MELIACEÆ.

TOONA Roem.

Toona Calantas Merrill & Rolfe nom. nov.

Cedrela odorata Blanco Fl. Filip. (1837) 184; ed. 2 (1845) 130; ed. 3, 2:130, non Linn.

Cedrella Toona F.-Vill. Nov. App. (1883) 45, non Roxb.

LUZON, Province of Cagayan, *For. Bur. 6652 Klemme*, April, 1907: Province of Tayabas, Mauban, *Vidal 2347:* Province of Isabela, *Vidal 2358:* Province of Rizal (Morong), *Vidal 2345:* Province of Camarines Sur, *Vidal 2346:* Province of Zambales, *Vidal 2348.* MINDORO, Bongabong River, *Whitford 1435*, February, 1906.

A species allied to *Cedrela febrifuga* Blume (=*Toona febrifuga* Roem.), but differing in its constantly larger fruits, which are 3 to 3.5, sometimes 4 cm in length. It apparently is widely distributed in the Philippines. We have here adopted the specific name *Calantas* from the native and trade name of the species, it being universally known in the Philippines by that name, the timber being fragrant and of considerable commercial importance. We have no doubt but that the two Philippine specimens doubtfully referred by C. DeCandolle[1] to *Cedrela febrifuga*, are really *Toona Calantas*. An allied species, possibly true *Toona febrifuga* Roem., is represented by *For. Bur. 5881 Curran*, from Zambales Province, Luzon, its fruits but 2 cm in length.

AGLAIA Lour.

Aglaia luzoniensis (Vidal) Merrill & Rolfe comb. nov.

Beddomea luzoniensis Vidal Rev. Pl. Vasc. Filip. (1886) 84.

Beddomea simplicifolia F.-Vill. Nov. App. (1883) 43, non Bedd.

Aglaia monophylla Perk. Frag. Fl. Philip. (1904) 33.

In describing *Aglaia monophylla*, Dr. Perkins indicated that it is possibly identical with Vidal's *Beddomea luzoniensis*, and on examining the type of the latter we are able to affirm the identity of the two species, here adopting the earlier specific name. The species is widely distributed in the Philippines and is represented by the following specimens:

LUZON, Province of Tayabas, *Vidal 169*, (type of *Beddomea luzoniensis* Vid.): Province of Albay, *Vidal 2341:* Province of Rizal, Bosoboso, *For. Bur. 3257 Ahern's collector:* Province of Camarines Sur, *Ahern 123.* MINDORO, Bongabong River, *For. Bur. 3623, 3661, 3677, 3745, 3756 Merritt; Whitford 1411.* NEGROS, *For. Bur. 7236 Everett.* DINAGAT, *Ahern 487.* TINAGO, *Ahern 415.* MINDANAO, Province of Surigao, *Ahern 667.* PALAWAN, *For. Bur. 3541 Curran; Bur. Sci. 224 Bermejos; 733 Foxworthy.* PANAY, *Vidal 2364.*

Var. **trifoliata** Merrill & Rolfe var. nov.

Most of the leaves trifoliolate, a few unifoliolate, in other characters as in the species.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4724 Mearns & Hutchinson*, May, 1906.

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[1] *Records Bot. Surv. India* 3 (1908) 373.

MALPIGHIACEÆ.

ASPIDOPTERIS A. Juss.

Aspidopteris ovata (Turcz.) Merrill & Rolfe comb. nov.

Ryssopteris ovata Turcz. in Bull. Soc. Nat. Mosc. **36**^{2} (1863) 583.

Aspidopteris sp. Vidal Phan. Cuming. Philip. (1885) 99.

Combretum sexalatum Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 212, in part, excl. *For. Bur. 3130 Ahern's collector.*

LUZON, Province of Albay, *Cuming 941, 945:* Province of Rizal, Novaliches, *Loher 5138;* Montalban, *Loher 175, 176;* Bosoboso, *Merrill 2811; For. Bur. 1163, 1868, 3126, 3321 Ahern's collector:* Province of Tayabas, Lucena, *Merrill 2891.* PANAY, Miagao, *Vidal 2738.* TICAO, *Vidal 2242.* MASBATE, *Merrill 3380.*

A rather widely diffused and somewhat variable endemic species, apparently related to *Aspidopteris elliptica* A. Juss. It was first described by Turczaninow under *Ryssopteris*, his type being one of Cuming's numbers cited above. However, Vidal, in working up Cuming's plants, overlooked Turczaninow's description and entered it in his Phanerogamae Cumingianae Philippinarum as *Aspidopteris* sp. *Combretum sexalatum* Merrill, is a mixture, being based on the flowering specimens of a true *Combretum* (p. 116), while the fruiting specimen described is *Aspidopteris ovata.*

POLYGALACEÆ.

POLYGALA Linn.

Polygala persicariaefolia DC. Prodr. **1** (1824) 326; Chodat Monog. Polygal. (1891) 331; *β* **Wallichiana** Chodat l. c.

Polygala septemnervia Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 202.

PHILIPPINES, without locality, *Mirholitz.* LUZON, Province of Benguet, *Merrill 4263, 4401.* PANAY, *Vidal 2090.*

We are of the opinion that *Polygala septemnervia* Merr., can not be distinguished specifically from *P. persicariaefolia* DC., it being accordingly here reduced.

British India to southern China and Timor, with some forms in tropical Africa.

Polygala japonica Houtt. Handleid. **10** (1779) 89, *t. 62, f. 1;* Chodat Monog. Polygal. (1891) 353.

Polygala luzoniensis Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 202.

LUZON, Province of Benguet, *Loher 1631; Merrill 4368.*

Polygala luzoniensis Merrill is apparently only a form of *P. japonica* and is here reduced to that species.

Japan to Formosa and Celebes.

Polygala triphylla Ham. in D. Don Prodr. Fl. Nepal. (1825) 200; Chodat l. c. 41.

LUZON, Province of Benguet, Kabayan, *Merrill 4442,* October, 1905.

India to southern China and Japan; new to the Philippines.

DICHAPETALACEÆ.

DICHAPETALUM Dup.-Thouars.

Dichapetalum luzoniense Merrill & Rolfe sp. nov. § *Eudichapetalum.*

Frutex scandens; ramis junioribus dense fulvo-pubescentibus; foliis elliptico-ovatis, acutis vel obscure acuminatis, supra nervis exceptis glabris, subtus praesertim ad nervos dense olivaceo-pubescentibus; cymis axillaribus, solitariis, pedunculatis, dichotomis, dense fulvo-pubescentibus; calycis laciniis ad 3 mm longis, anguste ovatis; petalis 5, glabris, oblongis vel oblongo-spatulatis, apice fissis; ovario 3-loculare, dense villoso.

A scandent shrub, the branches densely pubescent, in age becoming nearly glabrous. Leaves alternate, coriaceous, 9 to 13 cm long, 4 to 7 cm wide, gradually narrowed from the middle to the obscurely acuminate apex and to the acute base, the upper surface shining, glabrous except the nerves which are pubescent, beneath densely pubescent; nerves about 8 on each side of the midrib, prominent, the reticulations distinct; petioles densely fulvous-pubescent, 5 mm long or less. Cymes rather densely flowered, axillary, solitary, dichotomous, densely pubescent, including the peduncle 4 to 5 cm long, 3 to 4 mm wide. Calyx densely pubescent outside, glabrous within, the lobes about 3 mm long, narrowly ovate, acute. Petals 5, free, glabrous, oblong to oblong-spatulate, 3 mm long, 1 mm wide, cleft at the apex. Stamens glabrous; filaments 2.5 mm long; anthers 0.5 mm long. Ovary ovoid, triangular in cross section, 3-celled, densely pubescent. Fruit (immature) densely ferruginous-hirsute, obovoid, 1-celled, about 1.5 cm long.

LUZON, Province of Rizal, Bosoboso, *Bur. Sci. 1128 Ramos*, July, 1906; Antipolo, *For. Bur. 3157 Ahern's collector*, June, 1905; *Vidal 469*, in Herb. Kew; Province of Laguna, Los Baños, *Elmer*, April, 1906.

Allied to *Chailletia deflexifolia* Turcz., of the Malay Peninsula, but apparently distinct.

EUPHORBIACEÆ.

MALLOTUS Lour.

Mallotus anisophyllus Hook. f. Fl. Brit. Ind. 5 (1887) 436.

PALAWAN, *Bur. Sci. 787, 883 Foxworthy*, May, 1906.

Malay Peninsula and Borneo; new to the Philippines.

ANACARDIACEÆ.

PISTACIA Linn.

Pistacia philippinensis Merrill & Rolfe sp. nov.

Arbor usque ad 8 m alta; foliis 10 ad 18 cm longis; imparipinnatis, 9-jugatis, foliolis glabriusculis, integris, basi acutis, apice acuminatis, valde inaequilateralibus; inflorescentiis femineis paniculatis, diffusis, usque ad 15 cm longis; drupis 5 mm longis, ovoideis, leviter compressis, rugosis.

A tree about 8 m high with odd pinnate about 9-jugate leaves, the leaflets lanceolate, acuminate, strongly inequilateral, 2.5 to 5 cm long, 5 to 8 mm wide, the panicles terminal and lateral, 15 cm long or less, the mature fruits ovoid, about 5 mm long. Branches reddish-brown, slender, terete or somewhat angled, lenticellate, glabrous, the young growing tips frequently somewhat pubescent. Leaves alternate, 10 to 18 cm long, the rachis slender, glabrous; leaflets about 9 pairs, strongly inequilateral, membranous when young, becoming firm and subcoriaceous in age, glabrous, somewhat shining above, entire, the base acute, the apex gradually and sharply acuminate, 2.5 to 5 cm long, 5 to 8 mm wide, subsessile, the nerves rather obscure. Panicles 15 cm long or less, slightly pubescent, densely ferruginous-tomentose at the base only, diffuse. Female flowers sessile or short-pedicellate, 1.5 mm long or less, the bracts deciduous, the sepals about 1.5 mm long. Ovary subglobose; style 2-cleft. Male flowers pedicelled, the bracts if any early deciduous. Stamens 3; anthers 2 mm long, the filaments very short. Drupe about 5 mm long, slightly longer than broad and somewhat compressed, rugose when dry.

LUZON, Province of Benguet, Tilad and Ambuklao, *Loher 737; Vidal 1825;* Baguio, *For. Bur. 5093 Curran*, August, 1906.

An interesting species, the first representative of the genus to be reported from the Philippines, well characterized by its comparatively narrow leaflets and 2-cleft styles.

MANGIFERA Linn.

MANGIFERA LAGENIFERA Griff.; Perkins Frag. Fl. Philip. (1904) 25.

This species must be excluded from the known Philippine flora, as of the specimens cited by Perkins l. c., *Cuming 2330* is from Malacca, correctly localized in Engler's monograph of the family,[a] while *Merrill 610* from CULION is *Buchanania florida* Schauer! = *B. arborescens* Bl

DRACONTOMELUM Blume.

Dracontomelum Dao (Blanco) Merrill & Rolfe comb. nov.

Paliurus Dao Blanco Fl. Filip. (1837) 174; ed. 2 (1845) 122; ed. 3, 1:219.

Dracontomelum mangiferum F.-Vill. Nov. App. (1883) 56; Merr. in Govt. Lab. Publ. **27** (1905) 36; Philip. Journ. Sci. **1** (1906) Suppl. 84, non Blume.

Dracontomelum celebicum Koorders in Meded. 's Lands Plantent. **19** (1898) 410, *nomen.*

LUZON, Province of Tayabas, Baler, *Merrill 1082*, August-October, 1903; Gumaca, *Whitford 869*, September, 1904: Province of Nueva Ecija, *Vidal 175:* Province of Albay, *Vidal 2549, 2550:* Province of Bataan, Lamao River, *For. Bur. 1528, 1648, 1670 Borden.* MINDORO, Puerto Galera, *Merrill 3322;* Baco River, *McGregor 302.*

Blanco's *Paliurus Dao* was referred by F.-Villar to *Dracontomelum mangiferum* Blume, in which he was followed by later authors, but the Philippine material on comparison with authentic specimens of Blume's species was found to differ constantly from *D. mangiferum* in its much smaller leaflets. Blanco's specific name is here retained for the Philippine form, for although his description is short and rather imperfect it manifestly applies to the specimens here cited. Engler[b] has referred *Poupartia pinnata* Blanco to *Dracontomelum mangiferum* Blume, but it seems probable that *Poupartia pinnata* Blanco is really referable to *Spondias mangifera* Willd. *Dracontomelum celebicum* Koorders, from Celebes, is apparently identical with the form here considered, so far as can be determined from the fragmentary cotype in Herb. Kew. *Dracontomelum Dao* seems to be more closely allied to *D. sinense* Stapf than to *D. mangiferum* Blume. The species is remarkable for its strongly developed buttresses. It is commonly known to the natives of the Philippines as *dao*. The wood is rather soft and of little value.

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[a] DC. Monog. Phan. 4 (1883) 211.

[b] DC. Monog. Phan. 4 (1883) 252.

SWINTONIA Griff.

Swintonia luzoniensis Merrill & Rolfe sp. nov.

Foliis subcoriaceis, utrinque concoloribus, glaberrimis, oblongis vel oblongo-obovatis, obtusis, 5 ad 9 cm longis, 1.8 ad 3.5 cm latis, basi decurrentibus, nervis lateralibus utrinque 9 vel 10; drupis oblongo-ovoideis; petalis auctis, oblongis vel lanceolatis, obtusis, quam drupis 3-plo longioribus.

A tree with oblong to oblong-obovate glabrous shining subcoriaceous leaves 9 cm long or less, the base acuminate-decurrent, forming narrow wings along the petiole for about one-half its length. Branches reddish-brown or grayish, terete, glabrous, the leaves crowded along the upper portion of the young branches. Leaves 5 to 9 cm long, 1.8 to 3.5 cm wide, the apex broad, rounded or obscurely broadly acuminate, the base long-decurrent, shining, coriaceous; nerves 9 or 10 on each side of the midrib, spreading, reticulate, the secondary nerves and reticulations prominent; petioles 2 to 3.5 cm long. Flowers unknown. Fruit oblong-ovoid, slightly inequilateral, 1.5 to 2 cm long, 10 to 12 mm in diameter, the persistent and accrescent petals reflexed, variable, 4.5 to 6 cm long, 5 to 10 mm wide, oblong to lanceolate, obtuse, gradually narrowed toward the base.

LUZON, Province of Tayabas, Baler, *Merrill 1057*, August, 1903: Province of Albay, *Vidal 3463a;* the latter, consisting of immature fruits only, received at Kew mixed with a species of *Vitex*, probably having been picked up in the forest.

Apparently most closely allied to *Swintonia Schwenkii* Kurz of the Malay Peninsula and Borneo, differing from that species in having its petioles flattened above and narrowly winged, its leaves not glaucous beneath, etc. The first representative of the genus to be found in the Philippines.

CELASTRACEÆ.

GYMNOSPORIA Benth. & Hook. f.

Gymnosporia spinosa (Blanco) Merrill & Rolfe comb. nov.

Cupania spinosa Blanco Fl. Filip. (1837) 184; ed. 2 (1845) 204; ed. 3, 2:17.

Gymnosporia philippinensis Vidal Phan. Cuming. Philip. (1885) 103, *nomen.*

Putterlickia ? philippinensis Planch. ex Vidal l. c. as syn.

Gymnosporia montana F.-Vill. Nov. App. (1883) 47; Vidal Cat. Pl. Prov. Manila (1880) 23; Rev. Pl. Vasc. Filip. (1886) 88; Ceron Cat. Pl. Herb. (1892) 46, non Laws.

LUZON, Province of Batangas, *Cuming 1575:* Province of Cagayan, *Bolster 192:* Province of Bataan, Dinalupijan, *Merrill 1507;* Albucay, *Vidal 190;* Mariveles, *Loher 5136:* Province of Rizal, *Loher 304, 305, 306;* Bosoboso, *Bur. Sci. 1474 Ramos;* San Juan del Monte, *Vidal 189:* Province of Nueva Ecija, *For. Bur. 6034 Zschokke:* Province of Pampanga, Mount Arayat, *For. Bur. 3648 Curran:* Province of Albay, Bacon, *Vidal 2404*. LUBANG, *Merrill 978*. TICAO, *For. Bur. 1045 Clark.*

Apparently an endemic species, not the same as *Celastrus montanus* Roxb., although apparently included by Lawson in the aggregate *Gymnosporia montana* in Hooker's Flora of British India. Blanco's description of *Gymnosporia spinosa* applies closely to the specimens here considered, and accordingly his specific name, being the oldest one available, is here adopted. *Gymnosporia philippinensis* Vidal was based on Planchon's herbarium name *Putterlickia ? philippinensis*, both being *nomina nuda*. The specimen, Cuming no. 1575, is certainly only *Gymnosporia spinosa* with immature leaves. We have not been able satisfactorily to identify Vidal's *Gymnosporia ambigua*, briefly characterized in his Sinopsis, Atlas (1883) 20, *t. 31, f. B.*, no specimens being extant, and the description being very imperfect.

Var. **parva** Merrill & Rolfe var. nov.

Frutex glaber usque ad 2 m alta, differt a typo foliis multo minoribus, 2.5 ad 3.5 cm longis, 1 ad 2 cm latis.

LUZON, Province of Rizal, Montalban, *Merrill 5070*, March, 1905, in thickets along the Mariquina River.

RHAMNACEÆ.

VENTILAGO Gaertn.

Ventilago gracilis (Vidal) Merrill & Rolfe comb. nov.

Kurrimia gracilis Vidal Rev. Pl. Vasc. Filip. (1886) 89.

Erroneously ascribed by Vidal, probably owing to lack of fruiting specimens at the time, to *Kurrimia* (*Celastraceae*), but a valid species of *Ventilago*, and accordingly here transferred to that genus.

LUZON, Province of Rizal, *Vidal 1122* (type); *Loher 335; For. Bur. 3073 Ahern's collector.*

VITACEÆ.

AMPELOCISSUS Planch.

Ampelocissus imperialis (Miq.) Planch. in DC. Monog. Phan. **5** (1887) 408.

Vitis ? imperialis Miq. Fl. Ind. Bat. (1860) Suppl. 518; Ann. Mus. Lugd. Bat. **1**:89.

Cissus ochracea Teysm. & Binn. in Tijdsch. Nederl. Ind. 27 (1864) 35.

Vitis ochracea Teysm. in Planch. l. c. as syn.; Ceron Cat. Pl. Herb. (1892) 51.

LUZON, Province of Albay, Gubat, *Vidal 2429*. CULION, *Merrill 668*, February, 1903. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 331*, March, 1906.

Sumatra, Java, and Borneo.

Ampelocissus barbata (Wall.) Planch. in DC. Monog. Phan. **5** (1887) 408.

Vitis barbata Wall. in Roxb. Fl. Ind. ed. Carey, **2** (1832) 478; Laws. in Hook. f. Fl. Brit. Ind. **1** (1875) 651, in part; King in Journ. As. Soc. Beng. 65^2 (1896) 387; Ceron Cat. Pl. Herb. (1892) 51.

PANAY, *Vidal 2442*. SEMERARA, *Merrill 4150*.

Assam, Burma, etc., to the Andaman Islands and Perak.

Both the above species are enumerated from the Philippines in Ceron's Catálogo, published in Manila in 1892, but as this work is rather obscure, it has been considered advisable to list the species again, giving their synonomy and distribution.

TILIACEÆ.

TRIUMFETTA Plumier.

Triumfetta repens (Blume) Merrill & Rolfe comb. nov.

Porpa repens Blume Bijdr. (1825) 108; Miq. Fl. Ind. Bat. 1^2 (1859) 198.

Triumfetta subpalmata Soland. ex Hemsl. in Journ. Bot. **28** (1890) 2, *pl. 293, f. 1.*

Triumfetta procumbens Merr. in Govt. Lab. Publ. (Philip.) **6** (1903) 17, non Forst.

LUZON, Province of Camarines Sur, *Merrill 3373*, November, 1903: Province of Pangasinan, *For. Bur. 8401 Merritt & Curran*, December, 1907. MINDORO, Pola, *Merrill 2387*, May, 1903.

Hemsley l. c. has shown that this form is distinct from *Triumfetta procumbens* Forst., but Blume's specific name is much the earlier and is here retained for the species. It is the type of the genus *Porpa* Blume. A cotype of Blume's species is in the herbarium of Columbia University, and Dr. C. B. Robinson who has examined it informs us that it is identical with the material cited above.

Seashores, Java, Borneo, islands off the coast of Cochin China, Keeling Islands and some groups of islands off the coast of Queensland.

MALVACEÆ.

HIBISCUS Linn.

Hibiscus syriacus Linn. Sp. Pl. (1753) 695; Masters in Hook. f. Fl. Brit. Ind. **1** (1874) 344; F.-Vill. Nov. App. (1880) 25; Naves l. c. *t. 346.*

MINDORO, Calapan, *Bur. Sci. 930 Mangubat*, June, 1906.

The only previous record for this species as a Philippine plant is that of F.-Villar, and his work being in general so untrustworthy, it is again recorded here. The species occurs in the Philippines only as a cultivated plant, as is the case with *Hibiscus rosa-sinensis* L., *H. mutabilis* L., and *H. schizopetalus* Hook.

SIDA Linn.

Sida corylifolia Wall. Cat. (1828) no. 1805; Masters in Hook. f. Fl. Brit. Ind. **1** (1874) 342; E. G. Baker in Journ. Bot. **30** (1892) 240.

LUZON, Province of Rizal, *Vidal 2169, 2180; For. Bur. 2447 Ahern's collector.*

The species is not common in the Philippines, and is apparently local, the only previous record of the species from the Archipelago being that of Baker, l. c.

Burma to southern China, Java and the Philippines.

Sida balabacensis Merrill & Rolfe sp. nov.

Suffruticosa, erecta; ramis ramulis pedicellis calycibusque plus minus dense cinereo-stellato-puberulis; foliis oblongo-ovatis, basi rotundatis, apice acuminatis, margine dentatis, subtus leviter puberulis; floribus axillaribus solitariis, pedicellis circiter medium articulatis, geniculatis, usque ad 3 cm longis; carpellis 8, 5 mm longis, verrucosis, apice birostratis, rostris 4 mm longis, retrorso-pilosis.

Erect, more or less branched, suffrutescent. Branches somewhat compressed, densely gray-stellate-puberulent or pubescent. Leaves oblong-ovate, 5 to 8 cm long, 2 to 3.5 cm wide, the base broad, rounded or slightly cordate, the apex acuminate, the margins irregularly dentate, submembranous, somewhat pubescent beneath, glabrous above except on the nerves, the base with a pair of strong nerves and one or two pairs of shorter ones, the primary nerves above the basal ones about 4 on each side of the midrib, distant, prominent, ascending, the reticulations lax; petioles puberulent, 10 to 14 cm long. Flowers large for the genus, 3 cm in diameter, yellow, the lower ones axillary, solitary, the upper ones forming a terminal raceme, the pedicels jointed in the middle, geniculate, densely puberulent, 3 cm long or less, the bracts deciduous, linear, densely pubescent, about 8 mm long. Calyx densely stellate-pubescent, 1.5 to 2 cm in diameter, cleft to about the middle; the teeth ovate, acute or somewhat acuminate, about 7 mm long, each 3-nerved. Petals about 17 mm long, 14 mm wide, irregularly triangular-obovate, retuse, with numerous nerves radiating from the base, slightly pilose, the base acute. Staminal column about 4 mm long, stamens very numerous. Ovary pubescent. Carpels about 8, rugose, somewhat stellate-pubescent on the upper or exposed surface, about 5 mm long, each tipped with two 4 mm long awns which are furnished with reflexed hairs. Seeds black, triangular-compressed like the carpels, glabrous except the pubescent top and the awns.

BALABAC, *Bur. Sci. 456 Mangubat*, March April, 1906.

A species somewhat resembling *Sida corylifolia* Wall., but distinguished from that species by its large flowers and puberulent branches, pedicels, calyx, etc.

BOMBYCIDENDRON Zoll.

Bombycidendron Vidalianum (Naves) Merrill & Rolfe comb. nov.

Hibiscus Vidalianus Naves in Blanco Fl. Filip. ed. 3, *pl. 333, nomen;* Vidal Sinopsis Atlas 16, *pl. 16, f. C.*, with description; Cat. Pl. Prov. Manila (1880) 19.

Hibiscus grewiaefolius F.-Vill. Nov. App. (1880) 24, excl. syn. Miquel.

Thespesia campylosiphon Vidal Rev. Pl. Vasc. Filip. (1886) 64, non Turcz.

Bombycidendron glabrescens Warb. in Perk. Frag. Fl. Philip. (1904) 110.

LUZON, Province of Rizal, *Loher 138, 139; Vidal 1174;* Montalban, *Merrill 5078;* Bosoboso, *For. Bur. 1870, 3331 Ahern's collector; Bur. Sci. 4627, 4679 Ramos; For. Bur. 10015 Curran;* Antipolo, Decad. Philip. Forest Fl. 27: Province of Bulacan, Norzagaray, *Yoder 84:* Province of Benguet, Baguio, *For. Bur. 5139 Curran.*

The specific name here adopted for this species was published as a *nomen nudum* in 1880, and with a description in 1883, being redescribed by Warburg in 1904 as *B. glabrescens. Bombycidendron campylosiphon* (Turcz.) Warb. is quite distinct from *B. vidalianum*, being characterized by its dense, soft pubescence, Vidal erroneously reducing the species, that was dedicated to him, to Turczaninow's species. *B. parvifolium* Warb. is very similar to *B. campylosiphon* in its pubescence, but has smaller leaves. The type, preserved in the Berlin Herbarium, is very fragmentary, and consists of poorly prepared leaf-specimens only, so that it will prove difficult to establish the validity of the species.

STERCULIACEÆ.

PTEROSPERMUM Schreb.

Pterospermum Cumingii Merrill & Rolfe sp. nov.

Arbor vel arbuscula; foliis oblongis, leviter acuminatis, basi subaequalibus vel leviter inaequalibus, rotundatis, supra glabris, subtus dense ferrugineo-puberulis, 4 ad 8 cm longis, 2 ad 3.5 cm latis; fructibus oblongis, cylindricis, circiter 3 cm longis, breviter apiculatis.

A tree or shrub, the branches terete, the older ones grayish, glabrous, the younger ones densely ferruginous-puberulent as are the petioles, under surfaces of the leaves, and the fruits. Leaves oblong, 4 to 8 cm long, 3 to 3.5 cm wide, subcoriaceous, glabrous and shining above, beneath densely ferruginous-puberulent, the apex short and bluntly acuminate, the base rounded, subequal or slightly oblique; nerves prominent beneath, the basal ones 3, with sometimes an additional faint submarginal pair, the primary lateral ones, above the base, 4 on each side of the midrid, the reticulations nearly obsolete; petioles puberulent, 1 to 1.8 cm long. Fruit 2.5 to 3 cm long, cylindrical, about 1.8 cm in diameter, the base abruptly contracted into a short stout cylindrical pseudostalk, the apex short-apiculate, the outside very densely ferruginous-puberulent. Seeds, including the wings, about 1.7 cm long.

PHILIPPINES, without locality, *Cuming 1860*, in Herb. Kew.

A species allied to *P. niveum* Vidal and to *P. obliquum* Blanco, differing from both in its nearly inequilateral leaves and other characters.

THEACEÆ.

SCHIMA Reinw.

Schima Noronhae Reinw. ex Blume Cat. Gew. Buitenzorg (1823) 80; Bijdr. (1825) 130; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1886) 80.

PALAWAN, Mount Pulgar, *For. Bur. 3881 Curran*, February, 1906.

Eastern India to southern China and the Malayan region; new to the Philippines.

TERNSTROEMIA Linn.

Ternstroemia Toquian (Blanco) F.-Vill. Nov. App. (1880) 18.

Llanosia Toquian Blanco Fl. Filip. ed 2 (1845) 319.

Ternstroemia Lobbiana Pierre Fl. Forest. Cochinch. (1887) *pl. 123*, in note.

Ternstroemia penangiana Ceron Cat. Pl. Herb. (1892) 22, non Choisy.

A species common and widely distributed in the Philippines, extending from 700 to 1,500 m alt., here enumerated to call attention to the reduction of Pierre's species and to correct the identification in Ceron's Catálogo.

Celebes.

GORDONIA Ell.

Gordonia luzonica Vidal Rev. Pl. Vasc. Filip. (1886) 57.

Gordonia fragrans Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 95.

A species not uncommon in the mountains of Luzon, *G. fragrans* not being distinct from Vidal's species.

GORDONIA VIDALII Szysz. in Engl. & Prantl Nat. Pflanzenfam. 3^6 (1893) 185.

G. acuminata Vidal Rev. Pl. Vasc. Filip. (1886) 58, non Zoll.

This species must be excluded from the *Theaceæ*, as the type, *Vidal 1146*, is a sterile specimen of *Shorea or Hopea* (*Dipterocarpaceæ*), with a large foliaceous gall, which was mistaken by Vidal for a flower bud.

DIPTEROCARPACEÆ.

DIPTEROCARPUS Gaertn. f.

Dipterocarpus vernicifluus Blanco Fl. Filip. ed. 2 (1845) 31: Brandis in Journ. Linn. Soc. Bot. 31 (1895) 31; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 97.

D. velutinus Vidal Rev. Pl. Vasc. Filip. (1886) 59; Brandis l. c.

D. fulvus Blume Mus. Bot. 2 (1852) 37; Brandis l. c. 40.

This is a common and widely distributed endemic species, yielding most of the timber that enters the Manila market under the name of "panao." The specimens referred to this species by Vidal, Revision 59, are all sterile, and two of them are apparently *Dipterocarpus grandiflorus* Blanco. *D. velutinus* Vidal we consider to represent typical *D. vernicifluus* Blanco, and is accordingly reduced, as our large series of specimens agree both with Vidal's type specimen and with Blanco's description. *D. fulvus* Blume was based on a sterile specimen collected in the Philippines by Perrottet, and an examination of the type in Herb. Leiden shows it to be sapling leaves of *D. vernicifluus*.

PARASHOREA Kurz.

Parashorea plicata Brandis in Journ. Linn. Soc. Bot. 31 (1895) 104.

P. Warburgii Brandis l. c.

But one species is represented in all our Philippine material. *P. plicata* was based on *Vidal 76, 990*, and *2033*, all with flowers, while *P. Warburgii* was based on fruits alone. We have a specimen, *Bur. Sci. 3289 Ramos*, with mature fruit, from the same locality as the type of *P. plicata*, the leaf and branch characters agreeing perfectly with Vidal's specimens; at the same time the fruits are identical with the type specimen of *P. Warburgii*, which must accordingly be reduced to *P. plicata*. The species is not uncommon in the Philippines and is represented by the following additional specimens:

LUZON, Province of Sorsogon, *For. Bur. 4528 Zschokke*, May, 1906; *For. Bur. 5754 Pray*, December, 1906: Province of Rizal, Bosoboso, *Bur. Sci. 1461, 3289 Ramos*: Province of Laguna, Santa Maria Mavitac, *For. Bur. 10071 Curran*; Mount Banajao, *For. Bur. 8051 Curran & Merritt*; Malicboi, *Ritchie 51*; Guinayangan, *Hagger*: Province of Camarines Sur, Pasacao, *Ahern 104, 291*. MASBATE, *Whitford 1673*. CATANDUANES, *For. Bur. 6679 Pray*. NEGROS, Gimagaan River, *Whitford 1616*. MINDANAO, Province of Surigao, *Ahern 356*; *For. Bur. 7563*

PENTACME A. DC.

Pentacme contorta (Vidal) Merrill & Rolfe comb. nov.

Shorea contorta Vidal Sinopsis Atlas (1883) 15, *t. 15. f. E;* Rev. Pl. Vasc. Filip. (1886) 88; Brandis in Journ. Linn. Soc. Bot. **31** (1895) 88; Merrill in Philip. Journ. Sci. **1** (1906) Suppl. 98.

Pentacme paucinervis Brandis in Journ. Linn. Soc. Bot. **31** (1895) 73.

There is no doubt as to the identity of the above two species, and accordingly Vidal's name, being the earlier, is here accepted and transferred to *Pentacme.* The specimens on which *Pentacme paucinervis* was based (*Vidal 79, 1166, 2176*) are all in flower, no fruit being present, while of the specimens of *Shorea contorta* examined by Brandis (*Vidal 987, 2159*) the former is with fruit and the latter with immature buds, the condition of the latter no doubt accounting for the fact that Brandis was unable to distinguish in it the floral characters of *Pentacme;* he states morover that *Shorea contorta* is anomalous in its floral structure. The species is common and widely distributed in the Philippines, yielding much of the timber commercially known as Lauan. In addition to the five specimens collected by Vidal, cited above, we have also examined the following extensive series: *Merrill 2772, 2697; For. Bur. 2970, 3199 Ahern's collector; Bur. Sci. 3258 Ramos; For. Bur. 504, 511, 519, 538, 605 Barnes; Whitford 293; For. Bur. 650, 653, 821, 1748 Borden.*

SHOREA Roxb.

Shorea Malaanonan (Blanco) Blume Mus. Bot. **2** (1852) 34; A. DC. in DC. Prodr. 16^2 (1868) 631; Brandis in Journ. Linn. Sci. Bot. **31** (1895) 103; F.-Vill. Nov. App. (1880) 21.

Dipterocarpus Malaanonan Blanco Fl. Filip. ed. 2 (1845) 312; ed. 3, **2**: 214.

Mocanera Malaanonan Blanco Fl. Filip. ed. 1 (1837) 858.

Shorea polita Vidal Sinopsis Atlas (1883) 15. *t. 15. f. D;* Rev. Pl. Vasc. Filip. (1886) 61; Brandis in Journ. Linn. Soc. Bot. **31** (1895) 88.

LUZON, Province of Rizal, *Vidal 2155, 2168, 2166, 71; Loher 116; For. Bur. 1168, 436 Ahern's collector:* Province of Tayabas, *Merrill 2851, 2589:* Province of Nueva Ecija, *Vidal 989.*

Widely distributed in Luzon and rather variable. We are of the opinion that the above specimens are referable to Blanco's species and accordingly his specific name is accepted, Vidal's *Shorea polita* being here reduced.

ANISOPTERA Korth.

Anisoptera thurifera (Blanco) Blume Mus. Bot. **2** (1852) 42; Brandis in Journ. Linn. Soc. Bot. **31** (1895) 44.

After examining a large series of specimens we have come to the conclusion that *Anisoptera Vidaliana* Brandis is scarcely distinct from Blanco's species, there being no constant characters by which the two can be distinguished. The fruit of *A. Vidaliana* as separated by Brandis has broader wings than does that of *A. thurifera,* but even this character does not appear to be constant. Two other closely related species occur in the Philippines, which may later have to be reduced, these being *A. tomentosa* Brandis, represented also by *For. Bur. 2985 Ahern's collector,* characterized by its leaves being slightly tomentose beneath, and *A. calophylla* Perk., which differs from typical *A. thurifera* by y more valid characters

LYTHRACEÆ.

LAGERSTROEMIA Linn.

Lagerstroemia piriformis Koehne in Engl. Bot. Jahrb. 4 (1883) 32; Pflanzenreich 17 (1903) 267.

Lagerstroemia Batitinan Vidal Rev. Pl. Vasc. Filip. (1886) 139; Koehne, l. c.

Lagerstroemia hexaptera Vidal Sinopsis Atlas (1883) *t. 52, f. A.*, non Miq.

After an examination of Vidal's numbers 365 bis and 784, on which the description of *L. Batitinan* was based, and comparing them with a specimen of *Cuming 1675*, a cotype of *L. piriformis*, we are of the opinion that the two species are identical, and the older name is here retained. Koehne states, l. c. 267, that Vidal's species was unknown to him, and in his monograph the two are distinguished only by some trivial characters. The species yields a valuable timber which is of considerable commercial importance in the Philippines, and is universally known as *Batitinan*.

COMBRETACEÆ.

COMBRETUM Linn.

Combretum confusum Merrill & Rolfe sp. nov.

Foliis membranaceis, ovatis vel elliptico-ovatis, usque ad 11 cm longis, obscure acuminatis, nervis utrinque 7, subtus costa venulisque plus minus pilosis; spicis densis in paniculis terminalibus confertis, rhachidibus ramis ramulisque dense ferrugineo-pubescentibus; floribus 12 mm longis, 4-meris, calycis tubo elongato, fauce hirtello.

Scandent, the branches light-grayish-brown, terete, glabrous, or the younger ones slightly lepidote. Leaves membranous, ovate to elliptical-ovate, entire, the base rather broadly acute, the apex acute or obscurely acuminate, 8 to 11 cm long, 5 to 7 cm wide, minutely pustulate on both surfaces, glabrous above, beneath more or less pilose along the midrib, in the axils and on the basal portions of the primary nerves, ultimately glabrous or nearly so; nerves about 7 on each side of the midrib, rather prominent; petioles 1 to 1.5 cm long, slightly lepidote. Inflorescence terminal, paniculate, about 15 cm long, the lower branches 7 cm long or less, the rachis, branches, and branchlets rather densely ferruginous pubescent, the flowers densely spicately disposed at the ends of the branches. Flowers yellow, 4-merous, obscurely glandular-lepidote, about 12 mm long, the buds acute. Calyx 4-angled, gradually wider upward, expanded above and villous at the throat, 4-lobed, the lobes reflexed, ovate, acute, 3 mm long. Petals 4, oblong, truncate, slightly exceeding 2 mm in length. Stamens 8, exserted; filaments nearly 6 mm long; anthers about 1 mm long; style 10 to 12 mm long. Fruit unknown.

LUZON, Province of Rizal, Bosoboso, *For. Bur. 3130 Ahern's collector*, June, 1905.

A species apparently closely related to *Combretum sundaicum* Miq., but differing from the latter in its larger leaves, densely pubescent inflorescence, and other characters. The type of the present species was the first number cited in the original description of *Combretum sexalatum* Merr.,[4] but that species being based on two different plants, and the specific name being derived from fruit characters, these fruiting specimens being those of *Aspidopteris ovata* (*Malpighiaceae*), we consider the fruiting specimens to represent the type of *Combretum sexalatum*, and the flowering specimen previously considered under that name is here redescribed. The present species in leaf and stem characters bears a striking resemblance to *Aspidopteris ovata*. (See p. 106.)

MELASTOMATACEÆ.

ASTRONIA Blume.

Astronia pulchra Vidal Rev. Pl. Vasc. Filip. (1886) 136.

Astronia glauca Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 31.

Types of both being compared at Kew, they were found to be identical, and *Astronia glauca* is here accordingly reduced.

ARALIACEÆ.

SCHEFFLERA Forst.

Schefflera odorata (Blanco) Merrill & Rolfe comb. nov.

Polyscias odorata Blanco Fl. Filip. (1837) 225.

Polyscias obtusa Blanco ? l. c. 226.

Paratropia crassa Blanco l. c. ed. 2 (1845) 158; ed. 3, **1**: 285.

Paratropia obtusa Blanco ? ll. cc. 159, 285.

Heptapleurum venulosum F.-Vill. Nov. App. (1883) 102; Vidal Sinopsis Atlas (1883) *pl. 55, f. E.*; Cat. Pl. Prov. Manila (1880) 32, non Seem.

Schefflera venulosa Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 110 non Harms.

LUZON, *Vidal 1486, 2931, 792; Loher 3591, 3592, 3593; Elmer 6414, 8312, 6058; Whitford 3, 62; Merrill 1886, 1670.* TICAO, *Vidal 2936.* MASBATE, *Merrill 3024.* LUBANG, *Merrill 973.* BASILAN, *For. Bur. 436 Hutchinson.* MINDANAO, *Copeland 594.*

A species very common and widely distributed in the Philippines, apparently endemic, but closely allied to the Malayan *Heptapleurum ellipticum* Miq. We are of the opinion that it is sufficiently distinct from that species, as well as from *H. venulosum* Seem., to which it has been referred by the above authors, and accordingly Blanco's specific name is here adopted.

In the original descriptions of *Heptapleurum Cumingii* Seem., and *H. caudatum* Vidal, there is an unfortunate confusion in the numbers cited, both descriptions being based on specimens representing two species, but neither description applying to the first number cited in each case, which was *Cuming 800*. The material of all the numbers of Cuming's collection has been examined in the Kew Herbarium and at the British Museum, and at the former place Vidal's material was also available, as well as the collections of Loher and the more recent collections made by American botanists. The following notes it is believed will clear up the confusion that has occurred regarding the species under discussion.

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[4] *This Journal*, **1** (1906) *Suppl.* 212.

Leaves 5- to 10-foliolate.

Panicle-branches scattered along the common rachis; leaflets 7 to 10, strongly caudate-acuminate .... 1. *S. caudata.*

Panicle-branches fascicled at the ends of the branches, no common rachis present; leaflets 5, slightly acuminate, 3-nerved at the base.. 2. *S. Cumingii.*

Leaves 3-foliolate; leaflets caudate-acuminate, not 3-nerved at the base.
3. *S. trifoliata.*

1. **Schefflera caudata** (Vidal) Merrill & Rolfe comb. nov.

Heptapleurum caudatum Vidal Phan. Cuming. Philip. (1885) 175; Rev. Pl. Vasc. Filip. (1886) 145, excl. Cuming 800.

Schefflera acuminatissima Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 109.

Luzon, Province of Albay, Tivi, *Vidal 793, 1429a,* the former being the type of the species ex descr.!: Province of Bataan, Mount Mariveles, *Whitford 172, 1222; For. Bur. 3005 Meyer.*

The original diagnosis of *Heptapleurum caudatum* Vidal, applies entirely to *Vidal 793*, and not at all to *Cuming 800,* although the latter is the first number cited, and as no type was indicated, *Cuming 800* would naturally be taken to represent the type of the species, unless the diagnosis was examined carefully and compared with the original specimens. *Schefflera acuminatissima* Merr., was described as "quite distinct from *Heptapleurum caudatum* Vidal," owing to the fact that the conception of Vidal's species in Manila was based on a specimen of *Cuming 800.* As a matter of fact, however, the type of this species is identical with *Vidal 793*, which we consider to be the type of *Schefflera caudata.*

2. **Schefflera Cumingii** (Seem.) Merrill & Rolfe comb. nov.

Heptapleurum Cumingii Seem. Journ. Bot. 3 (1865) 81; Rev. Hederac. (1868) 45, excl. Cuming 800.

Seemann describes this species as follows: "Foliolis 5 ellipticis acuminatis v. ovato-ellipticis longe acuminatis integerrimis 3-plinerviis; paniculis terminalibus pube stellato albido vestitis; drupis obovatis, 5-locularibus. Philippine Islands (Cuming! n. 800 et 1293)."

As was the case with *Schefflera caudata* (Vidal), *Cuming 800* is the first specimen cited, and would therefore naturally be taken to be the type of the species. However, in 5 sheets of *Cuming 800* that we have examined, including Seemann's type material at the British Museum, all the leaves are 3-foliolate, and although they are long-acuminate, they are not "3-plinerviis." In four specimens of *Cuming 1292* examined, the leaves are 5-foliolate, and although not long-acuminate, are strongly "3-plinerviis." It is apparent that Seemann drew up his description from both specimens, but mostly from the second number cited, the characters of which predominate in his diagnosis, and which we consider to be the type of the species. *Cuming 800*, while the first specimen cited in the original descriptions of both the above species, was really described in neither, and is here described as a new species. Seeman cites the number 1293, an error for 1292.

3. **Schefflera trifoliata** Merrill & Rolfe sp. nov.

Scandens; foliolis 3, glabris, submembranaceis, 10 ad 20 cm longis, oblongis vel oblongo-ovatis, integris, caudato-acuminatis; paniculis terminalibus, ramis elongatis, multifloris, furfuraceis; floribus superis fasciculatis, prope ramulorum basin umbellatis.

Scandent, glabrous, branches light-gray. Leaves alternate, trifoliolate, the petioles 3 to 8 cm long, somewhat dilated at the base, the petiolules 1.5 to 4 cm long. Leaflets oblong to oblong-ovate, entire, the apex caudate-acuminate, the acumen 1.5 to 2 cm long, submembranous, dull, the nerves 8 to 10 on each side of the midrib, the secondary ones and reticulations nearly as prominent as the primary nerves, all evident on both surfaces. Inflorescence terminal, its branches few, 20 to 25 cm long, springing from the apices of the branchlets, somewhat furfuraceous. Flowers numerous, the pedicels 4 to 5 mm long, those on the upper parts of the branches in 3- to 6-flowered fascicles, toward the base frequently in pedunculate umbels, the peduncles 8 mm long or less. Fruits oblong, 6 mm long, 3 mm wide, 5-sulcate.

LUZON, Province of Tayabas, *Cuming 800* (type): Province of Albay, Tivi, *Vidal 1429*: Province of Camarines Sur, Tigaon, *Vidal 1430*; Sipocot, *Vidal 794*.

OLEACEÆ.

JASMINUM Linn.

Jasminum pseudopinnatum Merrill & Rolfe sp. nov. § *Unifoliolata.*

Scandens; ramis ramulis petiolisque pubescentibus; foliis distichis, ovatis, membranaceis, subtus costa excepta glabris, ovatis, acuminatis, pinnatinerviis; inflorescentiis terminalibus, 1- ad 3-floris; floribus breviter pedicellatis; calyce cylindraceo, usque ad 3.5 mm longo, 4-dentato; corollae tubo 1.5 ad 1.8 cm longo, laciniis 7, lanceolatis, 10 ad 12 mm longis.

Scandent, the branches slender, terete, flexuous, the older ones light-gray, the younger ones brownish, the branchlets spreading and with the opposite leaves having the appearance of a 4- to 6-jugate pinnate leaf. Leaves ovate, glabrous except on the midrib beneath, which is slightly pubescent, the base broad and rounded or acute, acuminate at the apex, membranous, 2 to 5 cm long, 1 to 3 cm wide; nerves about 5 on each side of the midrib, distant, slender, anastomosing, the reticulations very lax; petioles 2 to 3 mm long. Inflorescence terminal, 1- to 3-flowered, the flowers short-pedicelled. Flowers white. Calyx cylindrical, about 3.5 mm long, glabrous, 4-toothed, the teeth less than 0.5 mm long. Corolla-tube slender, 1.5 to 1.8 cm long, the lobes 7, lanceolate, acute or acuminate, 10 to 12 mm long, 3 mm wide. Anthers oblong-lanceolate, apiculate, about 5 mm long.

LUZON, Province of Rizal, Bosoboso, *Bur. Sci. 1111 Ramos*, July, 1906; without locality, *Marave 181*, November, 1904.

Manifestly allied to *Jasminum aculeatum* (Blanco) Walp., but differing from that species by its few-flowered, not paniculate inflorescence, smaller, fewer-nerved leaves, shorter petioles, somewhat larger flowers, decidedly larger anthers, and fewer calyx-teeth.

Jasminum dolichopetalum Merrill & Rolfe sp. nov. § *Unifoliolata.*

Scandens, glabrum; foliis lanceolatis vel anguste elliptico-lanceolatis, glabris, membranaceis vel chartaceis, subtrinerviis, basi cuneatis, apice sensim anguste caudato-acuminatis; inflorescentiis terminalibus, paucifloris, breviter pedunculatis; floribus fasciculatis vel umbellatis; calycis laciniis 5, anguste lanceolatis, usque ad 1 mm longis; corollae tubo 13 mm longo, laciniis 10, linearibus, acuminatis, usque ad 3 cm longis, 1.5 ad 2 mm latis.

Glabrous throughout, scandent, the branches slender, smooth, brown. Leaves lanceolate to narrowly elliptical-lanceolate, membranous or chartaceous, the base cuneate, the apex gradually and narrowly caudate-acuminate, 6 to 10 cm long, 1.5 to 3 cm wide, the midrib prominent beneath and with a pair of submarginal basal nerves, anastomosing with the few distant lateral nerves, the reticulations very lax. Inflorescence terminal, few-flowered, the flowers white, 2 to 4, fasciculate or umbellate at the ends of the branches, the pedicels 3 to 3.5 cm long. Calyx short, the lobes 5, about 1 mm long, the corolla-tube about 13 mm long, slender, the lobes 10, very narrow and elongated, about 3 cm long, 1.5 to 2 mm wide. Anthers oblong-lanceolate, apiculate, 3 mm long.

LUZON, Province of Rizal, Bosoboso, *Bur. Sci. 995 Ramos*, June, 1906.

A very characteristic species, distinguished by its narrow, long-acuminate, glabrous leaves, few-flowered terminal inflorescence, long pedicels and very long corolla lobes.

LOGANIACEÆ.

MITRASACME Labill.

Mitrasacme nudicaulis Reinw. ex Blume Bijdr. (1826) 849; A. DC. Prodr. 9 (1845) 12; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 80; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1889) 117.

LUZON, District of Lepanto, Mount Data, *Merrill 4486*.

New to the Archipelago, and differing from the common and widely diffused *Mitrasacme alsinoides* in that its leaves are confined to a basal rosette.

Eastern India to southern China and Malaya.

GENTIANACEÆ.

HOPPEA Willd.

Hoppea dichotoma Willd. in Ges. Nat. Fr. Berl. Neue Schrift. 3 (1801) 435; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 100.

LUZON, Province of Benguet, Loo, *Loher 5045*.

A most interesting addition to our knowledge of the Asiatic element in the flora of northern Luzon, the genus containing but two species, both previously known only from British India.

APOCYNACEÆ.

CHONEMORPHA G. Don.

Chonemorpha elliptica (Blanco) Merrill & Rolfe comb. nov.

Tabernaemontana elliptica Blanco Fl. Filip. (1837) 115; ed. 2 (1845) 83; ed. 3, 1:152; F.-Vill. Nov. App. (1883) 132.

Chonemorpha macrophylla Merr. in Govt. Lab. Publ. **29** (1905) 45, non Don.

LUZON, Province of Rizal, Bosoboso, *Merrill 2704*; *For. Bur. 1141 Ahern's collector*; *Bur. Sci. 1065 Ramos*; *Loher 3881*; San Mateo, *Vidal 3265*.

The Philippine form cannot with propriety be referred to *Chonemorpha macrophylla* G. Don, as it has flowers about one-half the size of those of the latter and differs in some other characters. As the specimens above cited represent a different species, Blanco's specific name is here adopted, because this is certainly the plant that Blanco described under the name *Tabernaemontana elliptica*.

ALYXIA R. Br.

Alyxia lucida Wall. in Roxb. Fl. Ind. ed. Carey & Wall. **2** (1824) 540; Hook. f. Fl. Brit. Ind. **3** (1882) 635; King & Gamble in Journ. As. Soc. Beng. **74**^{2} (1907) 418.

CULION, *Merrill 614*, December, 1902.

Malay Peninsula to Sumatra and Borneo; new to the Philippines.

WRIGHTIA R. Br.

Wrightia calycina A. DC. Prodr. **8** (1844) 406; Miq. Fl. Ind. Bat. **2** (1856) 433.

GUIMARAS, *For. Bur. 228 Gammill.* MASBATE, *Merrill 3082, 3049.* PALAWAN, *For. Bur. 4510 Curran.*

The above specimens agree very closely in all essential characters with authentic specimens of this species from Timor, in Herb. Kew.

Timor.

ASCLEPIADACEÆ.

ISCHNOSTEMMA King & Gamble.

Ischnostemma carnosum (R. Br.) Merrill & Rolfe comb. nov.

Oxystelma carnosum R. Br. Prodr. (1810) 462.

Vincetoxicum carnosum Benth. Fl. Austral. **4** (1869) 331.

Cynanchum carnosum Schltr. in Perk. Frag. Fl. Philip. (1904) 120.

Ischnostemma selangorica King & Gamble in Journ. As. Soc. Beng. **74**^{2} (1907) 532.

LUZON, *Loher 4039, 4040*: Province of Bataan, Lamao River, *Williams 387*, December, 1903.

In 1907 King and Gamble described the above monotypic genus, based on specimens collected in Selangor by Ridley and the specimens collected by Loher in Luzon, cited above. In 1904, however, Schlechter had identified the second of Loher's two numbers as *Oxystelma carnosum* R. Br., and transferred the species to *Cynanchum*. In working over the material at Kew, the same number of Loher's collection being found cited under both the above genera, Mr. N. E. Brown, specialist on *Asclepiadaceæ* at Kew, was asked to compare the specimens with Robert Brown's type of *Oxystelma carnosum*. Both the type in the British

Museum and the duplicate type at Kew were examined, and Mr. Brown informed us that Loher's and Ridley's plants were undoubtedly referable to Robert Brown's species, which was however, in his opinion, not a *Cynanchum*. We have accordingly here accepted the genus *Ischnostemma*, adopting the earliest specific name available.

Australia, Luzon, and the Malay Peninsula.

IPOMOEA Linn.

Ipomoea quinata R. Br. Prodr. (1810) 486; Choisy in DC. Prodr. **9** (1845) 385; Clarke in Hook. f. Fl. Brit. Ind. **4** (1883) 214; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1890) 162.

Luzon, Province of Benguet, *Loher 2143, 2144*.

Eastern India to southern China and north Australia; not previously reported from the Philippines.

Ipomoea hispida (Vahl) R. & S. Syst. **4** (1819) 238.

Convolvulus hispidus Vahl Symb. **3** (1794) 29.

Ipomoea eriocarpa R. Br. Prodr. (1810) 484; Choisy in DC. Prodr. **9** (1845) 369; Benth. Fl. Austral. **4** (1869) 426; Clarke in Hook. f. Fl. Brit. Ind. **4** (1883) 204.

Luzon, Province of Benguet, Bued River, *Merrill 4270*, November, 1905, a narrow-leaved form.

Widely distributed in the tropics of the Old World from Asia to Australia; not previously reported from the Philippines.

Ipomoea involucrata Beauv. Fl. Owar. **2** (1807) 52, *t. 89*.

Ipomoea pileata Roxb. Fl. Ind. **1** (1832) 504; Choisy in DC. Prodr. **9** (1845) 365; Clarke in Hook. f. Fl. Brit. Ind. **4** (1883) 203; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1890) 162.

Culion, *Merrill 542*, December, 1902.

Tropical Africa and Asia; new to the Philippines.

MERREMIA Dennst.

Merremia vitifolia (Burm.) Hallier f. in Engl. Bot. Jahrb. **16** (1893) 552; Prain in Journ. As. Soc. Bengal **74**^{2} (1905) 303.

Convolvulus vitifolius Burm. Fl. Ind. **1** (1768) 45, *t. 18, f. 1*.

Ipomoea vitifolia Sweet Hort. Brit. ed. **2** (1830) 372; Choisy in DC. Prodr. **9** (1845) 361; Clarke in Hook. f. Fl. Brit. Ind. **4** (1883) 213.

Palawan (Paragua), Ewiig River, *Merrill 733*, February, 1902; *Bur. Sci. 802 Foxworthy*, April, 1906. Balabac, *Bur. Sci. 483 Mangubat*, March, 1906.

British India to the Malay Archipelago; new to the Philippines.

Merremia bufalina (Lour.) comb. nov.

Convolvulus bufalinus Lour. Fl. Cochinchin. **1** (1790) 109.

Ipomoea bufalina Choisy in Mém. Soc. Phys. Genèv. **6** (1833) 452; DC. Prodr. **9**: 360.

Ipomoea Riedeliana Oliv. in Hook. Icones **15** (1883) 19, *pl. 1424*.

Merremia Riedeliana Hallier f. in Engl. Bot. Jahrb. **18** (1904) 552.

Luzon, Province of Rizal, Montalban, *Merrill 5040*, March, 1906; Novaliches, *Loher 4156*, February, 1891: Province of Union, Bauang, *Elmer 5622*, February, 1904.

Cochin China and the Malay Archipelago; new to the Philippines.

ANISEIA Choisy.

Aniseia martinicensis (Jacq.) Choisy Convolv. Rar. (1838) 144; DC. Prodr. 9 (1845) 430; Hallier f. in Engl. Bot. Jahrb. 18 (1895) 96 et Bull. Herb. Boiss. 5 (1897) 382; Prain in Journ. As. Soc. Beng. 74² (1905) 301.

Convolvulus martinicensis Jacq. Select. Stirp. Am. (1763) 20, *t. 17*.

Convolvulus uniflorus Lam. Encycl. Meth. 3 (1789) 544.

Ipomoea uniflora R. & S. Syst. 4 (1819) 247; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 201.

PHILIPPINES, without locality, *Vidal 3356*, in Herb. Kew.

Widely distributed in the tropics; new to the Philippines.

BORRAGINACEÆ.

HELIOTROPIUM Linn.

Heliotropium strigosum Willd., var. **brevifolia** (Wall.) Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 151.

LUZON, Province of Zambales, Iba, *Merrill 428*, June, 1902; near Manila, *Wilkes Expedition*, in U. S. National Herbarium; without locality, *Loher 1544*.

Western Asia, Malacca and Australia; new to the Philippines.

Heliotropium bracteatum R. Br. Prodr. (1810) 493; Benth. Fl. Austral. 4 (1869) 397; DC. Prodr. 9 (1845) 547.

Heliotropium cyrtostachyum Miq. Fl. Ind. Bat. 2 (1859) 924.

MINDANAO, District of Davao, Davao, *Copeland 538*, March, 1904.

Java to northern Australia; new to the Philippines.

CYNOGLOSSUM Tourn.

Cynoglossum furcatum Wall. in Roxb. Fl. Ind. ed. Carey & Wall. 2 (1824) 6; DC. Prodr. 10 (1846) 149; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 155; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 149.

LUZON, Province of Benguet, Bued River, *Merrill 4299*, November, 1905.

Not previously recorded from the Philippines and the second species of the genus to be found in Luzon, differing from the more common *C. micranthum* Desf., in having the hairs on the under surface of the leaves and on the stem reflexed.

Afghanistan, throughout India to Ceylon, China and Japan.

LABIATÆ.

CALAMINTHA Lam.

Calamintha umbrosa (Bieb.) Benth. in DC. Prodr. 12 (1848) 232; Hook. f. Fl. Brit. Ind. 4 (1885) 650; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 284.

Calamintha repens Benth. l. c. 233.

Melissa umbrosa Bieb. Fl. Taur. Cauc. 2 (1808–19) 63.

Stachys rubisepala Elm. Leafl. Philip. Bot. 1 (1908) 338.

LUZON, Province of Benguet, Tabio, *Loher 4184, 4185*; Pauai, *Bur. Sci. 2748, 2846, 4357, 4358, 4389 Mearns*; District of Lepanto, Mount Data, *Merrill 4534*.

Caucasus Mountains, India, and Ceylon to Java, China, Japan, and Formosa, the first representative of the genus to be found in the Philippines.

SCROPHULARIACEÆ.

HEMIPHRAGMA Wall.

Hemiphragma heterophyllum Wall. Tent. Fl. Nepal. (1826) 16, *t. 8; Cat.* (1828) no. 3895; Trans. Linn. Soc. **13:** 612; Benth. in DC. Prodr. **10** (1856) 429; Hook. f. Fl. Brit. Ind. **4** (1884) 289; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1890) 192.

Nertera dentata Elmer Leafl. Philip. Bot. **1** (1906) 15.

Luzon, District of Lepanto, Mount Data, *Loher 5047, 5048; Merrill 4510:* Province of Benguet, Mount Santo Tomas (Tonglon) *Elmer 6239,* May, 1905; *Mearns s. n.* December, 1906; Pauai, *Bur. Sci. 4302, 4307 Mearns,* July, 1907.

The genus is here first reported from the Philippines, and is a striking example of the eastward extention of the Himalayan flora to the highlands of northern Luzon; erroneously ascribed by Elmer to *Nertera* (*Rubiaceae*).

Temperate Himalaya from Garwhal to Bhotan, Khasia Mountains, Yunnan and Formosa.

LIMNOPHILA R. Br.

Limnophila hirsuta (Heyne) Benth. in DC. Prodr. **10** (1846) 388; Hook. f. Fl. Brit. Ind. **4** (1884) 268; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1890) 186.

Stemodia hirsuta Heyne in Wall. Cat. (1828) no. 3930; Benth. Scroph. Ind. (1835) 24.

Mindanao, District of Davao, *Copeland 426,* March, 1904, in open wet places.

British India to Hongkong and the Malay Archipelago; not previously reported from the Philippines.

Limnophila sessiliflora (Vahl) Blume Bijdr. (1826) 750; Benth. in DC. Prodr. **10** (1846) 389; Hook. f. Fl. Brit. Ind. **4** (1884) 270; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1890) 186.

Hottonia sessiliflora Vahl Symb. **2** (1791) 36.

Luzon, Province of Benguet, *Loher 4350;* Baguio, *Elmer 5755; Merrill 4339; Bur. Sci. 3795 Mearns:* Province of Ilocos Norte, *Bur. Sci. 2271 Mearns,* January, 1907. Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 941,* February, 1907.

British India to Japan and the Malay Archipelago; an interesting aquatic plant not previously reported from the Philippines.

COMPOSITÆ.

ANAPHALIS DC.

Anaphalis contorta (Don) Hook. f. Fl. Brit. Ind. **3** (1881) 284.

Antennaria contorta Don in Bot. Reg. **7** (1821) *t. 605.*

Gnaphalium contortum Ham. ex Spreng. Syst. Veg. **3** (1826) 479.

Anaphalis tenella DC. Prodr. **6** (1837) 273.

Gnaphalium tenellum Wall. Cat. (1828) no. 2941, nomen.

Anaphalis cinnamomea Elmer Leafl. Philip. Bot. **1** (1906) 120, non Clarke.

Luzon, Province of Benguet, Pauai, *Bur. Sci. 4329 Mearns,* July, 1907; Mount Tonglon, *For. Bur. 5043 Curran,* August, 1906; *Elmer 6281,* May, 1904: District of Lepanto, Mount Data, *Merrill 4539,* November, 1905.

Temperate and subalpine Himalaya, the Mishmi Hills and the Khasia Mountains.

Anaphalis adnata DC. Prodr. **6** (1837) 274; Hook. f. Fl. Brit. Ind. **3** (1881) 282; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1888) 425.

LUZON, Province of Benguet, *Loher 3710; Baguio, Merrill 4334:* District of Lepanto, Mount Data, *Merrill 4549.*

Mountains of northern India to Martaban, Burma and Kwangtung. This species and the preceding have already been mentioned from Luzon by C. B. Robinson.[3]

GNAPHALIUM Linn.

Gnaphalium japonicum Thunb. Fl. Jap. (1784) 311; DC. Prodr. **6** (1837) 237; Benth. Fl. Austral. **3** (1866) 653; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1888) 427.

Gnaphalium oblancifolium Elmer Leafl. Philip. Bot. **1** (1906) 123.

LUZON, Province of Benguet, *Loher 3714;* Mount Santo Tomas, *Elmer 6556,* June, 1904; Bugias, *Merrill 4663,* October, 1905; Pauai, *Bur. Sci. 4348 Mearns,* July, 1907.

Japan and China to Australia and New Zealand. *G. oblancifolium* Elmer, can not be distinguished from the typical form.

Gnaphalium hypoleucum DC. in Wight. Contr. (1834) 21; Prodr. **6** (1837) 222; Hook. f. Fl. Brit. Ind. **3** (1881) 288.

LUZON, Province of Benguet, Bued River, *Merrill 4276,* October, 1905: District of Lepanto, Mount Data, *Merrill 4493,* November, 1905.

Temperate Himalaya to Japan and China; new to the Philippines.

ARTEMISIA Linn.

Artemisia capillaris Thunb. Fl. Jap. (1784) 309; DC. Prodr. **6** (1837) 126; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1888) 442.

Artemisia parviflora Rolfe in Journ. Bot. **23** (1885) 213; Vidal Rev. Pl. Vasc. Filip. (1886) 163; Ceron Cat. Pl. Herb. (1892) 103; Elmer Leafl. Philip. Bot. **1** (1906) 141, non Roxb.

The Philippine form is now represented at Kew by a full series of specimens collected by Vidal, Lober, Elmer, and Merrill, and after a careful examination of this material and comparison with the rich Indian and Chinese collections at Kew, we have come to the conclusion that the Philippine form must be referred to Thunberg's species rather than to Roxburgh's, the former being also very closely allied to *Artemisia scoparia* Waldst.

Manchuria to Kamtschatka and Japan, Pescadores, Formosa and southern China.

ANISOPAPPUS Hook. & Arn.

Anisopappus chinensis (Linn.) Hook. & Arn. Bot. Beech. Voy. (1841) 196; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1888) 431.

Verbesina chinensis Linn. Sp. Pl. (1753) 901; DC. Prodr. **5** (1836) 618.

Chrysogonum philippinense Elmer Leafl. Philip. Bot. **1** (1906) 161.

CULION, *Merrill 514,* December, 1902.

The Culion specimen on which Elmer based his *Chrysogonum philippinense,* does not belong in that genus, but is *Anisopappus,* not specifically distinct from *A. chinensis.*

Kwangtung, Hongkong and the Shan States.

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[3] Journ. N. Y. Bot. Garden **8** (1907) 115.

COSMOS Cav.

Cosmos sulfureus Cav. Icon. 1 (1791) 56, *t. 79;* F.-Vill. Nov. App. (1883) 118.

Coreopsis Drummondii Elmer Leafl. Philip. Bot. 1 (1906) 172, non Torr. & Gray.

A species introduced from tropical America and now spontaneous in the Philippines, although not nearly as common as *C. caudatus* H. B. K. The specimens cited by Elmer are certainly *Cosmos sulfureus* Cav., which we consider to be a true *Cosmos*, and only remotely resemble *Coreopsis Drummondii* Torr. & Gray.

BIDENS Linn.

Bidens bipinnata Linn. Sp. Pl. (1753) 832; DC. Prodr. **5** (1836) 603; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1888) 434.

Bidens pilosa L. var. *bipinnata* Hook. f. Fl. Brit. Ind. **3** (1881) 309.

Luzon, Province of Benguet, *Merrill 4308.*

Widely distributed in the warmer parts of the world; new to the Philippines.

Bidens tripartita Linn. Sp. Pl. (1753) 831; DC. Prodr. **5** (1836) 594; Hook. f. Fl. Brit. Ind. **3** (1881) 309; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1888) 436.

Luzon, Province of Benguet, *Loher 3637.*

Western Europe and northern Africa to China and Japan; new to the Philippines.

EPALTES Cass.

Epaltes australis Less. in Linnaea **5** (1831) 148; Benth. Fl. Austral. **3** (1866) 530; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1888) 423; Elmer Leafl. Philip. Bot. **1** (1906) 108.

Sphaeromorphaea Russeliana Elmer l. c. 140, non DC.

Luzon, *Loher 3612, 5086:* Province of Rizal, Caloocan, *Merrill 3655*, November, 1903.

The type of A. DeCandolle's genus *Sphaeromorphaea* is a plant collected in southern India by Russel and described by DeCandolle in Deless. Ic. Sel. Pl. 4. *t. 49* as *S. Russeliana.* In the Prodromus[6] he placed under this species as the var. *β glabrata*, a form collected for or by Royle in northwestern India, of which nothing more is known at present. Under his new genus he included further (1) *S. petiolaris*, a Port Jackson gathering of Gaudichaud's, which is identified by Bentham & Hooker[7] with *Epaltes australis* Lessing, non DC., and (2), but doubtfully, *Centipeda orbicularis* Lour., to which at least in part, belongs the material included under *Myriogyne minuta* Less.[8]

In the Genera Plantarum, species one and two of the Prodromus were duly reduced to the genera *Epaltes* Lessing, and *Centipeda* Loureiro, respectively, but *S. Russeliana*, the type of the genus, was left undisposed of. It was taken up again in the Flora of British India, fresh material having been meantime received from central India, collected by the late C. B. Clarke in the Chota Nagpore country. *S. Russeliana* is apparently a species of *Epaltes*, and manifestly akin to *E. australis*, but distinct from that and probably endemic in the Western

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[6] **6** (1827) 140.

[7] Gen. Pl. **2**:294.

[8] Prodr. **6** (1827) 139.

Peninsula. The plant from Siam seems to be not "*Russeliana*," but *S. australis* which is widely diffused throughout the Malayan and Pacific regions, and to which the Philippine specimens mentioned above must be referred. (J. R. D.)

SENECIO Linn.

Senecio luzoniensis Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 244.

This is evidently an endemic species representing the series of forms usually placed under *S. sarracenicus* or *S. nemorensis*, which extend from central and southeastern Europe through northern China to western China. The Luzon form is sufficiently distinguished from Chinese *S. nemorensis* by the sharper angles at which the secondary nerves of the leaf are given off from the midrib and their far shallower curvature. (J. R. D.)

GYNURA Cass.

Gynura rubiginosa (Elmer) J. R. Drummond comb. nov.

Senecio rubiginosus Elmer Leafl. Philip. Bot. **1** (1906) 154.

LUZON, Province of Benguet, Mount Santo Tomas, *Elmer 6246*.

I cannot see how this plant can be generically separated from *Gynura Vidaliana* Elmer, which belongs to a characteristic Indonesic group of closely allied forms. (J. R. D.)

Gynura Vidaliana Elmer Leafl. Philip. Bot. **1** (1908) 144.

LUZON, *Vidal 1499, 1510, 3135; Loher 3697, 3701, 3702; Micholitz s. n.; Merrill 4593, 4844*.

These apparently represent a single, rather variable species, but more material is needed to dispose of *Merrill 3937* from Mount Arayat, which appears possibly to be distinct. However it is possible that this species, with *G. purpurascens* DC., *G. aurantiaca* DC., possibly also *G. nepalensis* DC., and *G. Finlaysoniana*, constitute but forms of the officinal *G. Pseudo-China* DC. (J. R. D.)

Gynura sarmentosa DC. Prodr. **6** (1837) 298; F.-Vill. Nov. App. (1883) 120; Hook. f. Fl. Brit. Ind. **3** (1881) 335; Vidal Phan. Cuming. Philip. (1885) 122; Rev. Pl. Vasc. Filip. (1886) 163.

Gynura affinis Turcz. in Bull. Soc. Nat. Mosc. **24**^{1} (1851) 201; F.-Vill. l. c. 120.

Gynura scabra Turcz. l. c.

Senecio mindorensis Elmer Leafl. Philip. Bot. **1** (1906) 155.

This widely distributed species is well represented in the Kew herbarium, and we are of the opinion that the two species described by Turczaninow, based on Cuming's material, as well as *Senecio mindorensis* Elmer, are all referable to typical *Gynura sarmentosa* DC. We have not been able to identify the plant collected by Copeland, no. 1258, which was referred by Elmer, l. c. 147 to DeCandolle's species, and it is possibly not a *Gynura*.

NEW PHILIPPINE PLANTS FROM THE COLLECTIONS OF MARY STRONG CLEMENS, I.

By Elmer D. Merrill.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

From December, 1905, to October, 1907, Chaplain Joseph Clemens of the Seventeenth United States Infantry, accompanied by his wife, was stationed at Camp Keithley, Lake Lanao, Mindanao, and during this time Mrs. Clemens made extensive botanical collections which were forwarded from time to time to this herbarium for study. In the two years during which collections were made, somewhat over 1,200 numbers of plants were sent to Manila, besides a very extensive supplementary collection of unnumbered material.

Lake Lanao is located at an altitude of about 760 meters above the sea, and Camp Keithley is situated near the lake on the ridge between it and the Sulu Sea, the highest point on the reservation being about 815 meters above sea level. The region is subject to heavy rainfall, and during parts of the year fogs are very prevalent, so that the humidity is relatively high. The district was entirely unexplored botanically, and the collection, as was to be expected, has shown an unusually high percentage of novelties, containing many genera hitherto unknown from the Philippines, several apparently undescribed genera, many species new to the Archipelago, and a great number of undescribed species, while the range of many plants, previously known only from Luzon, has been extended to Mindanao. A number of novelties from this collection have been included in my previous papers, among them several new species, as well as genera and species new to the Philippines. The material still contained so much of interest that it was thought advisable to prepare and publish a series of two or three papers, for the greater part based on this collection.

The Lake Lanao region, politically, is one of the most turbulent districts in the Philippines, and has been under firm control during the recent years of American occupation only, and after several campaigns against the fanatical Moros who inhabit the region. Spanish authority was only nominal before the year 1898, while even at the present date the district can not be considered a safe one for the traveler. Minor outbreaks against the constituted authority were of not infrequent occurrence during the period while the collections here considered were being made, so that it was unsafe to go far from the military post without an escort. In addition to the element of personal danger attending botanizing in the region, the humidity is so high that good specimens could be prepared only with difficulty. Under the circumstances Mrs. Clemens is to be congratulated on the extent and value of the material which she secured.

The first set of the collection is deposited in the Herbarium of the Bureau of Science, where the types of the species here described are to be found. With the exception of the first set, and some specimens that have been sent to various specialists for study, the collection remains at the disposition of the collector.

URTICACEÆ.

LEUCOSYKE Zoll. & Mor.

Leucosyke candidissima (Blume) Wedd. in DC. Prodr. 16¹ (1869) 235ᵃ.

Urtica candidissima Blume Bijdr. (1825) 498.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens*, September, 1907.

A very striking species, previously known only from Java, the third of the genus to be found in the Philippines.

MORACEÆ.

FICUS Linn.

Ficus clementis Merrill sp. nov. § *Urostigma*.

Arbor procera, glabra; ramulis crassis, annulatis, angulatis; foliis coriaceis, oblongis vel elliptico-oblongis, breviter obtuseque acuminatis, basi acutis vel rotundatis, usque ad 20 cm longis, longe petiolatis; nervis utrinque ca. 7; receptaculis sessilibus, axillaribus, solitariis vel binis, ovoideis vel ellipsoideis, 2 ad 2.5 cm longis, basi grosse 3-bracteatis, bracteolis involucrantibus, usque ad receptaculi medium porrectis.

A very large tree, glabrous throughout. Branches thick, reddish-brown, angular, with many annular scars. Leaves oblong or elliptical-oblong, coriaceous, shining, 20 cm long or less, 7 to 10 cm wide, entire, apex shortly and obtusely acuminate, base rounded or acute, usually rather abruptly narrowed at both ends; primary nerves about 7 on each side of the midrid, anastomosing near the margins, and with alternating rather distinct secondary nerves, the reticulations rather close; petioles 5 to 7 cm long, the very young branches with numerous deciduous membranous lanceolate 8 cm long stipules, the apical scales on older branches coriaceous, ovate, short-acuminate, 1.5 to 2 cm long. Receptacles solitary or in pairs in the leaf axils, sessile, ovoid or ellipsoid, 2 to 2.5 cm long, when young entirely enclosed in the basal bracts, apex rounded, the ostiole obscure; basal bracts broadly ovate or reniform, coriaceous, rounded, imbricate, about 1.5 cm wide, reaching to about the middle of the mature receptacles. Male flowers numerous, pedicellate, the perianth of two coriaceous ovate lobes 1 mm long, about equaling the solitary stamen; anther 1.5 mm long, subsessile.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 703*, *421*, September, March, 1906, and without numbers, February and September-October, 1907.

A species allied to *Ficus procera* Reinw., *F. rigida* Miq., and *F. involucrata* Bl., well characterized, however, by its very large involucrate basal bracts and obscure ostiole.

Ficus cordatula Merrill sp. nov. § *Urostigma.*

Arbor magna, glabra, ramulis exceptis; foliis coriaceis, ellipticis vel oblongo-ovatis, breviter acuminatis, basi cordatis, 20 ad 28 cm longis, nervis utrinque 10 ad 12, prominentibus; receptaculis axillaribus, sessilibus, glabris, ellipsoideis vel oblongo-ovoideis, ca. 3 cm longis, basi 3-bracteatis, bracteis plus minus hirsutis, 7 mm longis, 10 ad 12 mm latis.

A large tree, glabrous except the branchlets which are more or less hirsute, the branches brown or gray, angular, stout, marked with annular scars. Leaves elliptical to oblong-ovate, coriaceous, shining above, 20 to 28 cm long, 9 to 15 cm wide, entire, or the margins slightly undulate, apex short and abruptly acuminate, the base rather broad, rounded, cordate, the sinus narrow, the lobes somewhat overlapping; nerves 10 to 12 on each side of the midrib, very prominent, anastomosing, distant, the reticulations distinct, the base with two stout nerves and several short fainter ones; petioles stout, 5 to 7 cm long; stipules ovate, acute or acuminate, hirsute, 2 to 2.5 cm long. Receptacles axillary, sessile, glabrous, ellipsoid or oblong-ovoid, about 3 cm long, 2 cm thick, the base with three broad bracts which are slightly hirsute, about 7 mm long, 10 to 12 mm wide. Male flowers few, only near the ostiole, about 5 mm long, the pedicels hirsute; perianth 2-lobed, inclosing the nearly sessile anther. Gall flowers sessile or pedicelled, the pedicels hirsute, the perianth inclosing the turgid 2 mm long ovary.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1089*, June, 1907, and without number, September-October, 1907.

A species allied to *Ficus altissima* Blume and *F. annulata* Blume, well characterized by its large sessile fruits and cordate leaves.

Ficus puncticulata Merrill sp. nov. § *Eusyce* ?

Arbor parva; ramulis, foliis subtus in nervis, petiolisque paucc hirsutis; foliis subcoriaceis, ovatis vel oblongo-ovatis, nitidis, 4 ad 6 cm longis, basi late rotundatis vel leviter cordatis, apice acuminatis, subtus minutissime puncticulatis; nervis subtus prominentibus, utrinque 3, ascendentibus; receptaculis axillaribus, sessilibus, solitariis, ca. 5 mm diam., glabris vel minute scaberrimis.

A small tree, the branches gray or reddish, the branchlets slender, reddish-brown, sparingly hirsute, becoming glabrous. Leaves alternate, ovate or oblong-ovate, subcoriaceous, shining above, 4 to 6 cm long, 2 to 3.5 cm wide, entire, the margins somewhat recurved, base broad, rounded, sometimes slightly cordate, apex acuminate, the acumen blunt, beneath minutely and densely puncticulate; nerves three on each side of the midrib, very prominent beneath, distant, curved-ascending, obscurely anastomosing, the reticulations rather distinct; petioles 2 to 3 mm long, sparingly hirsute. Receptacles axillary, solitary, globose, 5 mm in diameter or less, glabrous or nearly so, red. Male flowers not seen. Gall flowers (?) sessile, the perianth of three narrowly ovate, reddish, pellucid-punctate lobes 1 mm long or less, the ovary elliptical-ovoid, compressed, the styles short, united into a mass in the middle of the receptacle.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1164*, September, 1907.

A species manifestly allied to *Ficus ramentacea* Roxb., and undoubtedly of the section *Eusyce*, although the male flowers are unknown. Closely allied to *Ficus tayabensis* Elm., which was placed by Elmer in the section *Sycidium*, differing from that species in its sessile receptacles and fewer nerved leaves.

PROTEACEÆ.

HELICIA Lour.

Helicia graciliflora Merrill sp. nov.

Arbor parva, ca. 6 m alta; foliis elliptico-lanceolatis, submembranaceis, tenuiter acuminatis, subintegris vel pauce distanter dentatis, rariter grosse lobatis; racemis tenuibus, usque ad 20 cm longis, plus minus ferrugineo-hirsutis vel pilosis; floribus tenuissimis, 16 mm longis, ca. 1 mm diam., pauce pilosis.

A small tree about 6 m high. Branches slender, terete, grayish-brown, the young branchlets rather densely but deciduously brown-pilose or tomentose. Leaves elliptical-lanceolate, 10 to 14 cm long, 2.5 to 4.5 cm wide, submembranous, sharply and slenderly acuminate, the base acute, the margins subentire or with distant scattered teeth, rarely with one or two large lobes, glabrous above, beneath, especially on the nerves and midrib, more or less deciduous-brown-pilose; nerves about 7 on each side of the midrib, prominent, anastomosing, the reticulations lax; petioles 1.5 to 2 cm long, slender, the blade often decurrent as a very narrow margin. Racemes very slender, many flowered, 20 cm long or less, the rachis, pedicels and flowers more or less brown-pilose with deciduous hairs. Flowers very slender, about 16 mm long, 1 mm or less in diameter.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, April and September, 1907.

A very characteristic species, readily recognizable by its pubescence and very slender flowers. Among the Philippine species it is most closely allied to *Helicia loranthoides* Presl, but very distinct from that species.

LORANTHACEÆ.

LORANTHUS Linn.

Loranthus ovatifolius Merrill sp. nov. § *Dendropthoe.*

Glaber; foliis ovatis, acuminatis, subcoriaceis, nitidis, basi late-cordatis; racemis axillaribus, solitariis, confertis; floribus tenuibus, ca. 2 cm longis, 5-meris.

Glabrous throughout, branches terete, slender, pale-grayish-brown, lenticellate. Leaves opposite, ovate to broadly ovate, subcoriaceous, shining on both surfaces, 6 to 8 cm long, 4 to 6 cm wide, apex acuminate, rarely subacute, base broad, rather strongly cordate; nerves 5 or 6 on each side of the midrib, indistinct, irregular, the reticulations obscure; petioles 2 to 3 mm long. Inflorescence axillary, solitary, congested, about 3 cm long, the flowers 3–1 on 2–3 mm long lateral branches which are racemosely disposed, the rachis 1 to 1.5 cm long. Flowers scarlet, slender, about 2 cm long, one sessile, the others on each branchlet short-pedicellate, each subtended by a broadly ovate, acute or obtuse, concave bracteole about 2 mm long. Corolla cylindrical, about 1.5 mm in diameter, not swollen, 5-lobed, lobes extending nearly to the base, less than 1 mm wide; filaments 1.5 mm long; anthers equaling the filaments. Calyx oblong, 2 mm long, 1 mm thick, somewhat sulcate and angular, the limb short, 5-toothed; style about 2 cm long.

MINDANAO, without locality, on the seacoast, *Mrs. Clemens 1195*, October, 1907.

A species well characterized by its ovate glabrous shining broadly cordate leaves, congested inflorescence and 5-merous slender flowers.

MAGNOLIACEÆ.

TALAUMA Juss.

Talauma pubescens Merrill sp. nov.

Arbor ca. 15 m alta; ramis ramulis stipulis petiolis foliis subtus bracteisque plus minus dense pubescentibus; foliis elliptico-ovatis vel oblongo-ovatis, acuminatis, chartaceis vel subcoriaceis, 15 ad 30 cm longis, nervis utrinque ca. 20; floribus albis ca. 4 cm longis; petalis 9, glabris, anguste oblongo-obovatis vel subspatulatis, interioribus minoribus.

A tree about 15 m high, the branches terete, rather stout, dark-colored, pubescent, in age glabrous, the branchlets densely fulvous-pubescent. Leaves elliptical-ovate to oblong-ovate, chartaceous to subcoriaceous, 15 to 30 cm long, 8 to 14 cm wide, base rounded, apex rather short-acuminate, above shining and glabrous, beneath more or less pubescent with scattered hairs, in age subglabrous; nerves prominent, about 20 on each side of the midrib, anastomosing near the margin of the leaf: petioles densely pubescent, 2 to 3.5 cm long; stipules deciduous, linear-lanceolate, 8 or 9 cm long, densely fulvous-hirsute outside. Flowers white, fragrant, the buds inclosed in a deciduous, broadly ovate, acuminate, densely pubescent bract

3.5 to 4 cm long, the peduncles 3 to 4 cm long, densely pubescent. Sepals glabrous, oblong-obovate, obtuse, about 3.5 cm long, 1.4 cm wide. Petals usually 9, similar to the sepals, the inner gradually smaller, glabrous, the innermost ones subspatulate. Stamens indefinite, curved, 10 to 12 mm long. Carpels many, densely fulvous-pubescent. Mature fruit oblong-ovoid, 4.5 to 6 cm long, the carpels about 1 cm long, rounded, not apiculate, slightly pubescent, the seeds about 6 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 686*, September–October, 1906, and without numbers, March, May, June, and September, 1907.

A characteristic species recognizable by its pubescence and its obtuse carpels.

ANONACEÆ.

OXYMITRA Blume.

Oxymitra longiflora Merrill sp. nov.

Foliis oblongo-obovatis vel elliptico-obovatis, apice obtusis, basi leviter cordatis, subtus plus minus castaneo-pubescentibus, nervis utrinque ca. 16; floribus axillaribus, solitariis, usque ad 7 cm longis.

Scandent, the branches terete, lenticellate, dark-brown and more or less dark-brown-pubescent, the ultimate branchlets, petioles, pedicels and nerves on the under surface of the leaves densely so. Leaves oblong-obovate to elliptical-obovate, 18 to 20 cm long, 7 to 11 cm wide above the middle, the apex broad, rounded or obtuse or subtruncate, somewhat narrowed below the middle to the slightly cordate base, subcoriaceous, shining and glabrous above except the somewhat pubescent midrib and nerves, beneath glaucous, the midrib nerves and reticulations densely dark-brown-pubescent; nerves about 16 on each side of the midrib, very prominent, parallel, the reticulations distinct, parallel. Flowers axillary, solitary, the pedicels stout, 0.5 to 2 cm long, with an oblong-ovate acuminate bracteole at the lower one-third. Sepals 3, ovate, acute or acuminate, 1 cm long, 8 mm wide, densely pubescent on both surfaces. Outer petals lanceolate or linear-lanceolate, 7 cm long, 11 mm wide at the base, gradually narrowed upwards, the midrib prominent, pubescent outside, glabrous within and slightly concave at the base; inner three petals oblong-ovate, sharply acuminate, fleshy, coriaceous, glabrous, 9 to 10 mm long, 5 to 6 mm wide. Stamens numerous, 2.2 mm long, the connectives oblique, overlapping. Carpels numerous, about 1.5 mm long, densely villous, the glabrous styles thickened upward, the stigma slightly villous; ovules 1. Fruit oblong-ellipsoid, somewhat pubescent, acute, 1 cm long or less.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, June, 1907, in flower and *no. 689*, September, 1906, in fruit.

Oxymitra paucinervis Merrill sp. nov.

Foliis oblongis vel oblongo-lanceolatis, acuminatis, basi rotundis vel acutis, nervis utrinque ca. 8, valde obliquis; floribus axillaribus, 5.5 cm longis.

A scandent shrub, the branches terete, dark-brown, slender, glabrous, the branchlets densely ferruginous-pubescent. Leaves oblong to oblong-lanceolate, subcoriaceous, 7 to 14 cm long, 2 to 4.5 cm wide, not or but slightly narrowed toward the rounded, rarely acute base, the apex acuminate, glabrous above except the somewhat pubescent midrib, beneath glaucous, glabrous except on the slightly pubescent midrib and nerves; nerves very prominent, curved-ascending, strongly oblique, about 8 on each side of the midrib, the reticulations very obscure; petioles densely pubescent, becoming nearly glabrous, about 2 mm long. Flowers axillary, solitary, their pedicels short, pubescent, elongated in fruit. Sepals pubescent on both sides, broadly triangular-ovate, acute or acuminate, about 5 mm long and broad. Outer petals lanceolate, 5.5 cm long, 8 mm wide, narrowed above, fleshy, coriaceous, glabrous inside, pubescent outside, the midrib prominent, somewhat concave at the base; inner petals about 1 cm long, 4 mm wide, swollen and strongly concave at the base, long and gradually acuminate, coriaceous, somewhat pubescent outside on the upper half. Stamens many, 1.2 mm long, the connectives oblique, overlapping. Carpels many, ferruginous-villous, 1 mm long; styles slightly thickened upwards, glabrous. Fruit ellipsoid or oblong-ovoid, 1 cm long or less, slightly pubescent, acute or apiculate, with a single seed.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September, 1907, in flower and fruit (type), also from the same locality, *Mrs. Clemens 520*, May, 1906, and without numbers, June and September, 1906.

GONIOTHALAMUS Hook. f. & Thoms.

Goniothalamus philippinensis Merrill sp. nov.

Arbor parva, glabra; foliis oblongis, coriaceis, nitidis, nervis utrinque ca. 17; floribus magnis, petalis exterioribus late ovatis, 4 ad 5.5 cm longis, interioribus crassis, usque ad 1.5 cm longis, dense cinereo-pubescentibus; stylis integris.

A small tree, glabrous throughout except the flowers; branches slender, terete, light-brown or grayish. Leaves oblong, coriaceous, shining, 15 to 20 cm long, 4 to 7.5 cm wide, rather abruptly narrowed to both the acute base and slightly acuminate apex, the margins subparallel; nerves about 17 on each side of the midrib, spreading, anastomosing, not prominent, the reticulations obscure; petioles stout, 8 mm long or less. Flowers pale-green, solitary, axillary, their pedicels stout, about 2 cm long, sparingly pubescent. Calyx lobes broadly triangular-ovate, acute, the calyx about 1.5 cm in diameter. Outer three petals broadly ovate or ovate, 4 to 5.5 cm long, 3.5 to 4 cm wide, coriaceous, nearly glabrous except the basal portion outside, which is pubescent, acute or slightly acuminate; inner three petals 2 mm thick on the margins, almost woody, ovate, acute, connivent, 1 to 1.5 cm long, glabrous within, outside shining and densely gray-pubescent. Stamens indefinite, 1.5 to 2 mm long. Carpels about 12, oblong, 2.5 mm long, appressed-pubescent; styles about 2 mm long, enlarged above, the stigma oblique, entire.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1049*, June, 1907. Without locality, *Cuming 1746*, distributed as *Goniothalamus giganteus* Hook. f. & Thoms.

A species closely allied to *Goniothalamus giganteus* Hook. f. & Thoms., but differing in its more numerously nerved, differently shaped leaves, entire stigmas, and other characters.

MELODORUM Hook. f. & Thoms.

Melodorum clementis Merrill sp. nov.

Ramulis foliis paniculis floribusque plus minus ferrugineo-pubescentibus; foliis oblongo-ellipticis, obtusis, nervis utrinque 28 ad 30; floribus paniculatis, ca. 11 mm longis.

Scandent, branches terete, brown or gray, rather slender, lenticellate, glabrous, the branchlets somewhat ferruginous-pubescent. Leaves oblong-elliptical, coriaceous, 12 to 20 cm long, 4 to 8.5 cm wide, base and apex rounded, in age shining above and nearly glabrous, the younger ones somewhat pubescent, beneath rather densely ferruginous-pubescent; nerves 28 to 30 on each side of the midrib, very prominent beneath, the reticulations distinct; petioles slightly pubescent, 1 cm long or less. Panicles terminal and axillary, densely ferruginous-pubescent, the flowers fasciculately disposed. Flowers yellow or cream-colored, their pedicels 1 cm long or less and with a small bracteole. Sepals pubescent, triangular-ovate, acute or slightly acuminate, about 2 mm long. Petals 6, valvate, the three outer 10 to 11 mm long, 5 mm wide below, ferruginous-pubescent outside, glabrous within, the base slightly enlarged and concave, somewhat narrowed above the middle, acute or blunt, the three inner ones similar but glabrous, slightly shorter and from 3 to 3.5 mm wide. Stamens indefinite, 1 to 1.5 mm long, the connectives oblique, overlapping. Carpels about 10, villous, the style also villous; ovules 5, parietal. Fruit globose, 1.5 to 2 cm long, deciduously ferruginous-pubescent; seeds irregularly compressed, shining.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, July, 1907, (type), also from the same locality, *Mrs. Clemens 1097*, June, 1907, and without number, September–October, 1907.

DREPANANTHUS Maingay.

Drepananthus philippinensis Merrill sp. nov.

Arbor; foliis glabris, oblongo-ellipticis, acuminatis, usque ad 20 cm longis, nervis utrinque ca. 7; sepalis ovatis, intus glabris, extus pubescentibus; petalis ca. 18 mm longis.

A large tree (Clemens), 6 m high (Merritt), the branches terete, grayish, glabrous, the branchlets somewhat ferruginous-pubescent. Leaves coriaceous, 12 to 20 cm long, 5 to 8 cm wide oblong-elliptical, rather sharply acuminate, the base acute to rounded, shining, glabrous, sparingly pubescent on the midrib beneath; nerves about 7 on each side of the midrib, prominent, curved-ascending, the reticulations distinct; petioles 1 to 2 cm long. Peduncles axillary, or from axils of fallen leaves, few-flowered, short. Flowers yellowish-green. Sepals ovate, about 5 mm long, acute or acuminate, pubescent outside, glabrous within. Petals 6, similar, the outer three about 18 mm long, the basal portion concave, orbicular, the free portion about 14 mm long and 4 mm wide below, oblong-lanceolate, coriaceous, pubescent, narrowed above to the blunt apex, reflexed, the inner three similar but more connivent. Anthers indefinite, 1.2 mm long. Carpels 1.8 mm long, villous; ovules 4; styles about 1 mm long. Fruit ellipsoid or ovoid, about 2 mm long, glabrous, black; seeds 3 or 4, flattened, compressed.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1016*, April, 1907, also June and July, 1907, without numbers. MINDORO, near Lake Naujan, *For. Bur. 6892, 6896 Merritt*, April, 1907.

The first species of the genus to be found in the Philippines, well characterized by its few-nerved leaves. The other two species of the genus are confined to the Malay Peninsula and Sumatra.

PITTOSPORACEÆ.

PITTOSPORUM Solander.

Pittosporum clementis Merrill sp. nov.

Arbor usque ad 18 m alta; foliis lanceolatis, oblongo-oblanceolatis, vel elliptico-oblongis, valde acuminatis, basi sensim attenuatis, glabris, usque ad 14 cm longis, membranaceis, glabris, nitidis; inflorescentiis infra folia e ramis denudatis, 3 cm longis; floribus umbellulatis; calyce obtuse 5-dentato; ovario biloculari, dense villoso, sessili; fructibus compressis, orbicularibus, apiculatis, ca. 1 cm longis, bivalvatis.

A tree about 18 m high, glabrous except the inflorescence. Branches terete, gray or brownish, rather slender. Leaves membranous, lanceolate oblong-oblanceolate or elliptical-oblong, shining, glabrous, 9 to 14 cm long, 2.5 to 5.5 cm wide, apex rather slenderly and sharply acuminate, base gradually attenuate, the margins obscurely crenulate; nerves about 7 on each side of the midrib, not prominent, scarcely more prominent than are the rather dense brownish reticulations; petioles 2 cm long or less. Inflorescence from the branches below the leaves and from the leaf-axils, about 3 cm long, pubescent, the peduncles solitary or in pairs, slender, about 1 cm long, each bearing two or three short branches, the flowers in three- to six-flowered umbels at the ends of the branches, the pedicels 2 to 4 mm long. Calyx cup-shaped, about 2 mm long, slightly pubescent or glabrous, with 5 rounded teeth 0.5 mm long. Petals (in bud) oblong, 3 mm long, 1 mm wide; anthers 1.3 mm long. Ovary sessile, densely, villous, 2-celled. Fruit orbicular, compressed, about 1 cm in diameter, apiculate, slightly hirsute, ultimately glabrous.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 768, 892*, September, 1906, and January, 1907, also without numbers, March, May and September, 1907.

Well characterized by its glabrous, membranous, sharply acuminate leaves, lateral, rather few-flowered inflorescence, and orbicular, compressed fruits. Some of the specimens are indicated by the collector as trees, while others are indicated as epiphytes, but I can detect no difference between them.

Pittosporum epiphyticum Merrill sp. nov.

Glabra, epiphytica vel pseudo-epiphytica; foliis oblongo-oblanceolatis vel elliptico-lanceolatis, coriaceis, 20 ad 25 cm longis, nitidis, acuminatis, integris, basi plus minus attenuatis, acutis, nervis utrinque ca. 14; fructibus e ramis denudatis, breviter pedicellatis, solitariis vel fasciculatis, leviter compressis, apice apiculato-acuminatis, basi cordatis, ca. 2.5 cm longis.

Epiphytic or pseudo-epiphytic, eventually partly terrestial, glabrous. Branches stout, gray, glabrous. Leaves oblong-oblanceolate or elliptical-lanceolate, coriaceous, shining, rather strongly acuminate, the base somewhat attenuate, acute, entire, the margins slightly revolute, 20 to 25 cm long, 6 to 8 cm wide; nerves about 14 on each side of the midrib, not much more distinct than are the secondary nerves and rather dense reticulations; petioles 2 to 4 cm long. Fruits heart-shaped, borne on the branches below the leaves, short-pedicellate, somewhat compressed, glabrous, 2.5 cm long, 2 cm wide and nearly as thick, the apex apiculate-acuminate, the base cordate, 2-valved, solitary, or two or three at each node, the pedicels about 3 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1040*, April, 1907, and without number, September, 1907.

A species with the habit of, and closely allied to *Pittosporum resiniferum* Hemsl., which is widely distributed on the mountains of Luzon, differing from that species by its much larger leaves and differently shaped fruits. Its habit, from the collector's notes, is similar to that of Hemsley's species, which is very like that of most species of *Ficus* of the section *Urostigma*, that is, starting as an epiphyte or pseudo-epipthyte, and eventually reaching the ground and becoming terrestrial, or partly terrestrial, and in the course of time probably killing its host.

ROSACEÆ.

RUBUS Linn.

Rubus clementis *Merrill* sp. nov.

Scandens, ramis ramulis inflorescentiisque plus minus pubescentibus et aculeis brevibus reflexis armatis; foliis trifoliolatis; paniculis terminalibus, gracilibus, usque ad 60 cm longis, pendulis; calycibus dense pubescentibus.

Scandent. Branches terete, rather slender, reddish-brown and with the branchlets more or less pubescent and armed with scattered reflexed short spines. Leaves trifoliolate, their petioles 5 to 7 cm long, somewhat pubescent, aculeate, the petiolules of the lateral leaflets about 5 mm long, of the terminal one aculeate and 2 to 3 cm long; leaflets ovate to elliptical-ovate, chartaceous, 8 to 12 cm long, 4.5 to 6.5 cm wide, base rounded, apex slenderly acuminate, the margins above rather strongly serrate, the teeth apiculate, glabrous except the nerves of both surfaces, which are somewhat pubescent, the midrib beneath with few spines; nerves 7 or 8 on each side of the midrib, curved-ascending, very prominent beneath, the reticulations prominent, subparallel. Panicles terminal, rather slender, pendulous, 60 cm long or less, the lower branches 10 cm long or less, the rachis branches and branchlets pubescent and with scattered reflexed spines, the branches distant, spreading, few-flowered, gradually smaller upward. Flowers white or greenish-white, the bracts and bracteoles ovate-lanceolate, acuminate, about 2 mm long, the pedicels densely pubescent, 2 to 6 mm long. Buds globose, densely gray-pubescent. Sepals broadly ovate, about 5 mm long, 5 mm wide at the base, short-acuminate. Petals glabrous, orbicular-obovate, apex broad, rounded, base somewhat acute, 6 to 7 mm long. Stamens, carpels, and styles glabrous.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 740*, September, October, 1906, and without number, January, 1907, altitude about 800 m.

A species characterized by its long pendulous panicles which sway in the breeze, its trifoliolate strongly veined leaves, with prominent teeth, slender acuminate apex, etc.

RUTACEÆ.

MELICOPE Forst.

Melicope monophylla Merrill sp. nov.

Arbor parva; ramulis paniculis et subtus foliis pauce pubescentibus vel subglabris; foliis simplicibus, oppositis, oblongo-ellipticis vel anguste obovato-ellipticis, apice rotundatis, basi cuneatis, 15 ad 23 cm longis, nervis utrinque 14 ad 18, prominentibus, anastomosantibus; paniculis axillaribus, ca. 13 cm longis; floribus parvis, 3.5 mm longis; staminibus 8, inaequalibus.

A tree about 10 m high or less. Branches terete, light-gray, glabrous, the branchlets slightly hirsute or subglabrous, glandular, often slightly compressed. Leaves opposite, simple, the petiole 1.5 to 3 cm long, the petiolule 1 to 1.5 cm long, the blade 15 to 23 cm long, 6 to 11 cm wide, oblong-elliptical or narrowly obovate-elliptical, subcoriaceous, somewhat shining, glabrous above, somewhat pubescent and with prominent glands beneath, the apex rounded, sometimes retuse, the base cuneate; nerves 14 to 18 on each side of the midrib, prominent, anastomosing, the reticulations distinct, lax. Panicles axillary, many flowered, 13 cm long or less, sparingly pubescent. Pedicels about 1 mm long. Calyx 4-lobed, broadly ovate, acute, about 0.3 mm long. Petals 4, valvate, the tip inflexed, narrowly oblong, 3 to 3.5 mm long, about 1 mm wide. Stamens 8, four with filaments 2.5 to 3.5 mm long, the alternating four with filaments 1.5 to 2 mm long; anthers about 0.6 mm long. Ovary villous, depressed-globose; styles very short; stigmas minute. Fruit of 2 to 4 dehiscent rugose cocci, each coccus about 3 mm in diameter.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 491*, April, 1906, also *no. 409 bis*, March, 1906 and without numbers, May and November, 1906: District of Cotabato, *For. Bur. 3931 Hutchinson*, March, 1906.

Apparently allied to *Melicope helferi* Hook. f., but distinct; a species well characterized by its simple leaves.

PARAMIGNYA Wight.

Paramignya mindanaensis Merrill sp. nov.

Scandens, glabra, ramulis floribusque exceptis; foliis oblongo-ellipticis, 9 ad 12 cm longis, acuminatis; spinis solitariis, axillaribus, glabris, recurvis, ca. 1 cm longis; floribus axillaribus; solitariis vel binis, ca. 17 mm longis; filamentis plus minus pubescentibus.

A scandent shrub, nearly glabrous, the branches terete, yellowish-green, glabrous, slender, the branchlets slightly pubescent. Leaves alternate, oblong-elliptical, glabrous, subcoriaceous, 9 to 12 cm long, 3 to 6 cm wide, shining, base rounded or acute, apex acuminate; nerves not prominent, anastomosing, scarcely more distinct than are the secondary ones and reticulations; petioles about 1 cm long; spines axillary, solitary, rather stout, glabrous, somewhat recurved, about 1 cm long. Flowers axillary, solitary or in pairs, the slender pedicels 1 to 1.5 cm long. Calyx cupular, slightly pubescent, about 5 mm long and wide, the 5 teeth about 1.5 mm long, rounded. Petals white, imbricate, oblong, about 12 mm long, 5 mm wide, glabrous. Stamens 10; filaments thickened, somewhat pubescent, about 7 mm long; anthers 4 mm long. Disk cylindrical, about 2 mm long and thick, crenulate. Ovary and style about 10 mm long, somewhat pubescent, the ovary 5-angled, 5-celled, the style stout. Fruit (immature) 1.5 to 2 cm long, glabrous, usually curved.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, June and July, 1907, and *no. 591*, June, 1906.

BURSERACEÆ.

CANARIUM Linn.

Canarium racemosum Merrill sp. nov. § *Choriandra*.

Arbor ca. 15 m alta; foliis imparipinnatis, ca. 7-jugatis, foliolis oblongis, obtusis vel obscure acuminatis, ca. 20 cm longis, denticulatis, nervis utrinque 14 ad 20; inflorescentiis axillaribus, racemosis; floribus 3-meris, ca. 1 cm longis; fructibus 3.5 ad 4 cm longis, oblongis, triangularibus.

A tree about 15 m high. Branches much thickened, about 2 cm in diameter above, densely brown-pubescent. Leaves 80 cm long or less, odd-pinnate, about 7-jugate, rachis and petiole stout, angular, more or less brown-pubescent. Leaflets oblong, 10 to 23 cm long, 6 to 9 cm wide, subcoriaceous, shining on both surfaces, the upper surface somewhat pilose-hirsute on the midrib and with a few scattered hairs on the lamina, the under surface with scattered hairs on the nerves and reticulations, margins denticulate, apex obtuse or obscurely short-acuminate, base rounded to subcuneate; nerves 14 to 20 on each side of the midrib, prominent, anastomosing, the reticulations rather coarse, very distinct; petiolules pubescent, 1 cm long or less. Inflorescence of solitary axillary racemes 20 cm long or less, densely pubescent, the flowers borne above the middle. Flowers pinkish, 3-merous. Calyx pubescent, the lobes 3, elliptical-ovate, acute or slightly acuminate, 5 mm long and wide, densely ferruginous-pubescent outside, the pedicels about 5 mm long, bracteoles none. Petals 3, oblong-ovate, coriaceous, acute, about 10 mm long, 5 mm wide, densely pubescent outside, keeled, valvate. Stamens 6, 8 to 9 mm long, densely villous, inserted outside the disk and free from it; disk 3 to 3.5 mm long, very densely hirsute-villous. Ovary ovoid, 5 mm long, 3-celled, densely villous. Fruit narrowly ovoid, 3.5 to 4 cm long, acute, strongly triangularly compressed, when mature nearly or quite glabrous, the immature ones with numerous stiff brown hairs.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September, 1907.

A characteristic species apparently most closely allied to *Canarium asperum* Benth., of north Celebes. Readily recognized by its strongly-nerved leaves, large flowers, racemose inflorescence, and triangular fruits.

Canarium reticulatum Merrill sp. nov.

Arbor ca. 20 m alta; foliis 2–4-jugatis, imparipinnatis, foliolis elliptico-oblongis vel ovato-oblongis, subtus dense valdeque reticulato-venosis, pilosis; floribus sessilibus, 3-meris, spicatis, spicis axillaribus, solitariis, 4–10 cm longis; fructibus oblongo-ovoideis, 1.5 ad 1.8 cm longis, glabris.

A tree about 20 m high. Branches light-gray, glabrous, the younger ones more or less densely dark-brown- or ferruginous-pubescent. Leaves 2- to 4-jugate, odd pinnate, about 30 cm long, the petiole and rachis rather densely pubescent; leaflets elliptical-oblong to ovate-oblong, coriaceous, shining and glabrous above except on the somewhat pubescent midrib, beneath rather strongly pilose on the nerves and reticulations, the reticulations rather dense and very prominent, apex acute or short-acuminate, base cuneate to somewhat rounded, often inequilateral, margins minutely denticulate, 10 to 15 cm long, 4 to 8 cm wide; nerves very prominent, 16 to 20 on each side of the midrib, spreading, curved, parallel, the reticulations subparallel; petiolules pubescent, 5 mm long or less. Spikes axillary, solitary, 4 to 10 cm long, usually densely pubescent, stout, many flowered. Flowers sessile, buds globose, each subtended by two or three ovate basal bracteoles about 1.5 mm long. Mature flowers not seen. Petals three. Stamens six. Sepals in fruit broadly orbicular, rounded, 5 mm wide, 4 mm long, pubescent on both surfaces. Fruit oblong-ovoid, 1.5 to 1.8 cm long, light-gray, rugose, glabrous, obtuse, not compressed or angled.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1150*, September, 1907.

A species well characterized by its very strongly veined and reticulate leaves and spicate inflorescence. Mature flowers not available, and therefore its proper section is uncertain.

Canarium clementis Merrill sp. nov.

Arbor; foliis imparipinnatis, ca. 60 cm longis, 5-jugatis; foliolis elliptico-oblongis, acutis vel obscure acuminatis, subtus ferrugineo-pubescentibus, valde reticulatis; inflorescentiis axillaribus, paniculatis, ca. 30 cm longis, inflorescentiae ramis primariis usque ad 15 cm longis; floribus trimeris, sessilibus, fasciculatis; fructibus oblongo-ovoideis, 1 ad 1.5 cm longis.

A large tree, the branches gray, glabrous or slightly pubescent. Leaves 50 to 70 cm long, odd pinnate, about 5-jugate, the rachis and petiole subterete, glabrous or only slightly pubescent when young; leaflets oblong-elliptical, 12 to 24 cm long, 5 to 9 cm wide, acute or obscurely short-acuminate, margins obscurely denticulate, base cuneate to obtuse frequently somewhat inequilateral; above shining, glabrous or nearly so, except the pubescent midrib and nerves, beneath ferruginous and rather densely pubescent; nerves 15 to 20 on each side of the midrib, very prominent beneath, parallel, spreading, curved, the recticulations prominent. Panicles axillary, 30 cm long or less, when young densely ferruginous-pubescent, their primary branches 15 cm long or less. Flowers sessile, fasciculate, the buds ovoid. Calyx 3 mm long, 2.5 mm wide, pubescent, 3-toothed, teeth ovate, acute, about 1 mm long. Petals 3, nearly glabrous, oblong-ovate, acute or obscurely broadly acuminate, 4 mm long, 2.5 mm wide. Stamens 6, free; filaments 2 mm long; anthers 1.2 mm long. Ovary glabrous or nearly so. Disk wanting. Fruit oblong-ovoid, 1 to 1.5 cm long, 7 to 8 mm thick, glabrous, rugose, gray, not compressed or angular.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, February, March, 1907, also *no. 759*, September, 1906, and *no. 1175a*, September, 1907.

A species well characterized by its paniculate inflorescence, fasciculate sessile flowers, and its leaflets which are usually strongly ferruginous beneath and densely pubescent or puberulent.

SANTIRIA Blume.

Santiria glabra Merrill sp. nov. § *Eusantiria.*

Arbor, omnibus partibus glabratis; foliis imparipinnatis, 1–3-jugatis, foliolis oblongo-ovatis vel oblongis, acuminatis, 6 ad 9 cm longis, nervis utrinque ca. 7; paniculis axillaribus, e basi ramosis; floribus minutis, antheris dorsifixis; staminibus liberis, extra discum insertis.

A tree, glabrous throughout. Branches light-gray, slender, terete. Leaves odd pinnate, 1- to 3-jugate, the rachis and petiole 10 cm long or less; leaflets oblong-ovate to oblong, subcoriaceous, shining on both surfaces, paler beneath, 6 to 9 cm long, 2.5 to 4 cm wide, apex rather long and gradually acuminate, the acumen blunt, base acute, often somewhat inequilateral; nerves about 7 on each side of the midrib, somewhat prominent beneath, anastomosing, the reticulations lax; petiolules about 1 cm long, slender. Panicles axillary, solitary, 4 to 6 cm long, branched from the base. Flowers small. Calyx 3-lobed, lobes broadly triangular-ovate, acute. Petals 3, orbicular-ovate, obtuse, 2 mm wide at the base, about 1.7 mm long. Stamens 6, free, inserted outside the fleshy 6-ridged disk, filaments very short; anthers 0.5 mm long. Style very short.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, April, 1907.

A species well characterized by being glabrous throughout; the second one of the genus to be found in the Philippines.

MELIACEÆ.

CLEMENSIA Merrill gen. nov.

Flores polygamo-dioici, 8-meri, majusculi. Calyx cupularis, grosse 4-dentatus vel lobatus. Petala 8, in aestivatione subvalvata, spatulata, inferne cum tubo stamineo plus minus connata. Stamina in tubum cylindricum, laciniatum, petalis breviorem, intus sub apice 20-antheriferum coalita, antheris plus minus hirsutis, cum tubi laciniis alternantibus. Discus in floribus hermaphroditis nullus, in floribus masculinis brevissime annulatus. Ovarium liberum, hirsutum, 5-loculare, loculis 1-ovulatis. Stylus elongatus, hirsutus, stigmate capitato terminatus. Fructus indehiscens, 5-locularis. Semina crassa. Cotyledones crassae, superpositae, plantula transversali intra cotyledones inclusa. Arbor, foliis pinnatis. Inflorescentia axillaris, paniculata, elongata, pendula.

Clemensia macrantha Merrill sp. nov.

Arbor parva, 4 ad 6 m alta; foliis pinnatis, ca. 8-jugatis, usque ad 140 cm longis; foliolis oppositis vel alternis, ovatis vel oblongis, subcoriaceis, 20 ad 35 cm longis, acutis vel breviter acuminatis, nervis utrinque 16 ad 20; paniculis axillaribus, pendulis, elongatis, ramis brevibus; floribus majusculis, dense fulvo-hirsutis, 3.5 ad 4 cm longis, ca. 2 cm diam., brevissime pedicellatis; calyce cupulato, 2 ad 2.5 cm longo; petalis 8, spatulatis, 3 ad 4 cm longis; tubo staminifero cylindrico, 2 cm longo, 20-laciniato, intus villoso; antheris 20.

A small tree 4 to 6 m high. Leaves pinnate, 140 cm long or less, the petiole and rachis stout, dark-colored, somewhat pubescent, becoming subglabrous, the rachis somewhat produced and frequently bearing a few undeveloped leaflets at the apex; leaflets alternate below, opposite above, oblong or the lower ones ovate, some more or less falcate, 20 to 35 cm long, 9 to 12 cm wide, submembranous, somewhat shining, the apex acute or short-acuminate, the base usually inequilateral, subacute to rounded, the midrib and lateral nerves on both surfaces rather densely hirsute, otherwise nearly glabrous; nerves 16 to 20 on each side of the midrib, prominent, anastomosing near the margin, the reticulations subparallel, distinct, rather lax; petiolules stout, more or less pubescent, 5 mm long or less. Panicles elongate, axillary, pendulous, 90 cm long or less, when young rather densely fulvous-pubescent, becoming subglabrous in age, their branches few, short, 6 cm long or less. Buds densely fulvous-tomentose, each subtended by a deciduous, lanceolate, 5 to 8 mm long, bracteole. Flowers polygamo-diœcious, very large, yellowish-brown, 3.5 to 4 cm long and about 2 cm in diameter, the calyx and petals very densely fulvous-hirsute or tomentose, the pedicels short. Calyx cupular, 2 to 2.5 cm long, 2 cm in diameter, irregularly coarsely 4-toothed or lobed, the lobes 5 to 7 mm long, 6 to 8 mm wide. Petals 8, spatulate, 3 to 4 cm long, 6 to 10 mm wide above, obtuse, much narrowed below and more or less connate with each other and with the staminal tube, coriaceous, keeled in the middle portion and glabrous inside. Staminal tube somewhat angular, cylindrical, about 2 cm long, 7 mm in diameter, glabrous outside, villous within, somewhat constricted above, the margin with 20 erect narrowly oblong, usually lobed, more or less hirsute teeth, 5 to 6 mm long, about 0.8 mm wide. Anthers 20, alternating with the calyx teeth, 5 mm long, more or less hirsute on the back. Ovary ovoid, densely hirsute, 5-celled, each cell 1-ovuled, 5 to 6 mm in diameter; style about 17 mm long, narrowed upwards, densely hirsute in the lower two-thirds; stigma globose, 2 mm in diameter. Staminate flowers similar to the perfect ones, but the style glabrous, ovary aborted, and a short, annular, glabrous disk present. Fruit obovoid, indehiscent, woody, 4 to 5 cm long, strongly rugose when dry, densely fulvous-hirsute or tomentose, indehiscent, 5-celled, each cell with a thick 2.5 cm long seed.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 725*, September-October, 1906, and additional material without numbers collected in January, February, March, April, June, and September, 1907.

A striking genus, apparently allied to *Chisocheton* and *Dysoxylum*, but very distinct from both, and so far as I am able to determine, from all others in the family, well characterized by its very large flowers, 5-celled ovary, 20 stamens which are hirsute, 20-toothed staminal tube, and 5-celled indehiscent fruit.

According to the collector, an erect, unbranched, or slightly branched tree, 4 to 6 m high, the trunk 5 to 10 cm in diameter, the leaves crowded at the apex of the trunk, the inflorescence axillary, pendulous.

CHISOCHETON Blume.

Chisocheton clementis Merrill sp. nov.

Arbor maxima, glabra, inflorescentiis exceptis; foliis alternis, usque ad 60 cm longis, 2- ad 5-jugatis; foliolis subcoriaceis, pallidis, elliptico-oblongis vel oblongis, 15 ad 30 cm longis, oppositis, breviter acuminatis, nervis utrinque ca. 10; paniculis axillaribus, foliis subaequalibus, puberulis, ramosis; floribus ca. 15 mm longis, extus dense adpresso-hirsutis.

A tree reaching a height of 30 m. Branches thickened, reddish-brown, glabrous. Leaves 60 cm long or less, 2- to 4-jugate, the rachis produced and puberulent at the tip and with few undeveloped leaflets; leaflets opposite, elliptical-oblong or oblong, subcoriaceous, glabrous, pale, 15 to 30 cm long, 7 to 10 cm wide, sometimes slightly falcate, apex short-acuminate, base acute or rounded, slightly inequilateral; nerves about 10 on each side of the midrib, prominent beneath, the reticulations lax; petiolules 1 cm long or less. Panicles axillary, about as long as the leaves, the lower branches 15 cm long or less, puberulent, few-flowered. Calyx cup-shaped, rugose, densely pubescent, about 4 mm long and wide, truncate or obscurely toothed, the pedicels short and thick. Petals 5, linear-lanceolate, thick, about 16 mm long, 2 mm wide, glabrous inside, densely appressed-hirsute outside, recurved in anthesis. Staminal tube cylindrical, densely hirsute, about 12 mm long, 3 mm in diameter, cleft at the apex into 6 oblong, truncate teeth, 3.5 mm long, 1.5 mm wide. Stamens 6, alternating with the teeth of the staminal tube; anthers 3 mm long. Disk none or very short. Style 12 mm long, hirsute, 5-sulcate, gradually narrowed upwards; stigma capitate, 1 mm in diameter.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, July and September, 1907.

A species well characterized by its hirsute flowers and the curious prolongation of the leaf-rachis, with undeveloped leaflets. Resembling *Chisocheton cumingianus* (C. DC.) Harms, but the flowers very different.

Chisocheton fulvus Merrill sp. nov.

Arbor parva, ramis ramulis petiolis paniculis et subtus foliolis plus minus fulvo-pubescentibus vel hirsutis; foliis imparipinnatis, 40 ad 60 cm longis, ca. 5-jugatis, rhachidibus dense hirsuto-pubescentibus; foliolis oblongis, usque ad 20 cm longis, submembranaceis, acuminatis, basi inaequalibus, acutis, supra, costa excepta, glabra, subtus plus minus hirsutis; paniculis axillaribus, foliis brevioribus; floribus polygamo-dioicis, 4-meris; ovario dense hirsuto.

A small tree, the branches, branchlets, leaves and inflorescence more or less fulvous-pubescent or hirsute. Leaves alternate, odd pinnate, 40 to 60 cm long, about 5-jugate, the petiole and rachis densely hirsute-pubescent; leaflets submembranous, oblong, opposite, 20 cm long or less, 4.5 to 8 cm wide, the apex rather slenderly and sharply acuminate, the base inequilateral, acute, somewhat shining above and glabrous except the rather densely pubescent midrib and lateral nerves, beneath hirsute, sometimes falcate; nerves distinct, 15 or less on each side of the midrib; petiolules 5 mm long or less, densely fulvous-hirsute. Panicles axillary, 30 cm long or less, narrow, the lower branches 4 to 6 cm long, the rachis, branches, branchlets and pedicels densely fulvous-hirsute-pubescent, the flowers densely racemose-fasciculately disposed on the ultimate branchlets. Flowers about 1 cm long, the calyx cup-shaped, membranous, 2 to 2.5 mm long, 2 mm in diameter, slightly hirsute, obscurely toothed. Petals 4, narrowly oblong or oblanceolate, glabrous or nearly so, 9 to 11 mm long, 1.5 to 1.8 mm wide. Staminal tube cylindrical, 8 mm long, glabrous outside, somewhat hirsute within, the teeth oblong-lanceolate, 2.5 mm long, 0.5 mm wide; anthers 5 or more, alternating with the teeth, 2 mm long. Disk none. Ovary ovoid, densely hirsute, 4-celled; style about 6 mm long, hirsute; stigma capitate. In the staminate flowers the ovary is aborted and a short annular glabrous disk is present. Fruit immature, somewhat hirsute.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1046*, May, 1907, also *Mrs. Clemens 554*, *583*, *1062*, and three sheets without numbers, May and June, 1906–7.

AGLAIA Lour.

Aglaia costata Merrill sp. nov. § *Hearnia.*

Arbor ca. 10 m alta, ramis foliis paniculisque plus minus brunneo-lepidotis; foliis alternis, imparipinnatis, 4- vel 5-jugatis; paniculis diffusis, usque ad 30 cm longis, dense ferrugineo-lepidotis; floribus paucis, pedicellatis, lepidotis; fructibus ovoideis vel ellipsoideis, 2 ad 2.5 cm longis, rugosis et valde longitudinaliter 10-sulcatis.

A tree about 10 m high, the branches and branchlets densely brown-lepidote. Leaves alternate, 35 to 50 cm long, the petiole, rachis, petiolules and under surfaces of the leaflets more or less densely brown-lepidote;

leaflets opposite, oblong, submembranous, 12 to 20 cm long, 4 to 8 cm wide, apex acuminate, base acute, inequilateral, rather dull, glabrous above, except the midrib which is lepidote, beneath with scattered lepidote scales, densely lepidote on the midrib; nerves 10 on each side of the midrid, prominent beneath, obscurely anastomosing near the margins, the reticulations netted, indistinct; petiolules densely brown-lepidote, about 5 mm long. Panicles 30 cm long or less, diffuse, the rachis, branchlets, pedicels and flowers densely brown-lepidote, the lower branches frequently 15 cm long, the upper ones gradually shorter. Flowers few, three to five on each ultimate branchlet, racemosely disposed, the pedicels 3 to 5 mm long. Calyx 3.5 to 4 mm in diameter, the lobes broadly orbicular or reniform, rounded, about 2 mm wide, imbricate. Petals 5, imbricate, coriaceous, concave, glabrous, ovate to orbicular-ovate, about 3 mm long. Staminal tube free, glabrous, short, truncate, about 1.5 mm long, 2 mm in diameter. Stamens 5, inserted on the margin of the tube, exserted, the anthers sessile, broadly triangular-ovate, 1 mm long. Ovary oblong-ovoid, glabrous, 1.5 mm long. Fruit ovoid or ellipsoid, densely and minutely brown-lepidote, 2 to 2.5 cm long, about 2 cm thick, rugose and strongly longitudinally 5-sulcate, 5-celled, woody.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 568*, May, 1906, and without numbers, May, June, and September, 1907.

A species well characterized by its densely brown-lepidote branches, inflorescence and fruits, the last strongly 10-sulcate.

Aglaia pallida Merrill sp. nov. § *Euaglaia*.

Arbor ca. 25 m alta, plus minus stellato-lepidota; foliis alternis, imparipinnatis, ca. 40 cm longis, 4-jugatis: foliolis pallidis, membranaceis, ellipticis vel oblongo-ellipticis, acuminatis, 15 ad 20 cm longis; paniculis majusculis, 40 ad 50 cm longis, diffusis, multifloris; floribus pedicellatis, racemosis, 5-meris; tubo stamineo libero.

A tree about 25 m high, the branches glabrous, the petioles, rachis and inflorescence rather densely brownish-lepidote-stellate-pubescent, the lower surfaces of the leaflets with few stellate hairs. Branches terete, light-gray. Leaves alternate, about 40 cm long, odd pinnate, 4-jugate; leaflets pale, membranous, elliptical to oblong-elliptical, 15 to 20 cm long, 6 to 8 cm wide, the apex acuminate, the base sometimes narrowed, equilateral and slightly cordate; nerves 15 to 19 on each side of the midrib, prominent beneath, the reticulations lax, obscure; petiolules stout, 2 to 3 mm long. Panicles diffuse, 40 to 50 cm long, the lower branches about 20 cm long, the upper ones gradually shorter, rather densely stellate-pubescent, many flowered. Flowers racemosely disposed on the ultimate branchlets, their pedicels about 1 mm long. Calyx about 1 mm in diameter, 5-toothed, the teeth rounded, 0.2 mm long. Petals 5, orbicular or broadly-ovate, obtuse, concave, glabrous, 1 mm long. Staminal tube glabrous, globose or obovoid, 11 mm in diameter, truncate, free. Anthers

5, inserted on the lower half of the tube, included, 0.3 mm long. Ovary villous.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1228*, September, 1907.

A species well characterized by its diffuse panicles which exceed the leaves in length, and thinly membranous very pale leaves. Apparently allied to *Aglaia hexandra* Turcz., but very different from that species.

WALSURA Roxb.

Walsura multijuga King in Journ. As. Soc. Beng. 64² (1895) 83; Valeton in Icon. Bogor. 2 (1906) 156, *t. 135.*

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September, October, 1907.

The specimens from Mindanao agree almost perfectly with III E 46 and III F 23 of the Botanical Garden at Buitenzorg, distributed as *Walsura quadrilocularis* Valeton, and which Valeton, l. c., considers to be identical with *Walsura multijuga* King.

Malacca, Sumatra, and Banca; new to the Philippines.

DYSOXYLUM Blume.

Dysoxylum triangulare Merrill sp. nov.

Arbor parva, ca. 10 m alta; foliis ca. 65 cm longis, imparipinnatis, 8-jugatis; foliolis pallidis, costa nervisque plus minus hirsutis; racemis e ramis vetustioribus oriundis, brevibus, hirsutis, paucifloris; floribus 4-meris; petalis extus glabris; staminibus 6; fructibus glabris, valde 3-costatis, triangularibus, ca. 2 cm longis.

A tree about 10 m high, the branches brown, glabrous, the ultimate branchlets more or less puberulent or slightly hirsute. Leaves alternate, about 65 cm long, odd pinnate, 8-jugate, the petiole, rachis and petiolules rather densely hirsute-pubescent; leaflets pale, submembranous, elliptical-ovate to oblong-ovate, 10 to 18 cm long, 4 to 7 cm wide, the apex acute or obscurely acuminate, the base subacute to rounded or slightly cordate, the midrib and nerves on both surfaces somewhat hirsute, and with scattered hairs on the lower surface; nerves about 12 on each side of the midrib, prominent; petiolules 5 mm long or less. Racemes from the larger branches, several from the same protuberance, slightly hirsute, about 2 cm long, the pedicels about 1.5 mm long. Calyx about 3 mm in diameter, somewhat cup-shaped, obscurely toothed, slightly hirsute. Petals 4, narrowly oblong, glabrous, about 7 mm long, 2 mm wide. Staminal tube cylindrical, 7 mm long, the apex 6-toothed, the teeth 1.5 mm long, truncate; anthers 6, alternating with the teeth, 0.8 mm long. Disk about 1.5 mm long. Ovary hirsute; style 6 mm long, slightly hirsute below; stigma capitate. Fruit glabrous, orange-yellow when mature, about 2 cm long, 1.5 mm thick, pointed, triangular in cross section, with three strong ribs or keels running from the base to the apex, 3-celled, each cell 1-seeded.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 981*, March, 1907 (fruit), June, 1907 (flowers).

A species allied to *Dysoxylum cumingianum* C. DC., but well characterized by its strongly 3-keeled, triangular fruits.

Dysoxylum pyriforme Merrill sp. nov.

Arbor parva, ramulis foliisque plus minus dense hirsutis; foliis alternis, ca. 60 cm longis, 10-jugatis; racemis caulinibus, 2 ad 4 cm longis, pauce hirsutis; floribus 4-meris; fructibus anguste pyriformibus dense brunneo-lepidotis, ca. 2 cm longis.

A small tree, the branches stout, gray or brownish, the branchlets gray, lepidote, the ultimate tips densely hirsute. Leaves alternate, about 60 cm long, 10-jugate, odd pinnate, the petiole and rachis densely hirsute; leaflets opposite, oblong or oblong-lanceolate, 6 to 14 cm long, 2 to 3.5 cm wide, submembranous, apex acuminate or rarely acute, base subacute or rounded, sometimes inequilateral, dark above and densely hirsute on the midrib and lateral nerves, and with few hairs on the surface, beneath pale and densely hirsute; nerves 12 to 15 on each side of the midrib, rather distinct; petiolules about 1 mm long. Racemes on the larger branches and trunk, solitary or two or three from the same protuberance, 2 to 4 cm long, few flowered, slightly hirsute, the pedicels slender, about 3 mm long. Calyx ellipsoid, about 5 mm long, constricted at the apex, entire or obscurely toothed. Petals 4, oblong, about 5 mm long, 2 mm wide, hirsute outside. Staminal tube glabrous, cylindrical, 3.5 mm long, cleft to the middle into 8 oblong 1 mm wide truncate teeth; anthers 8, alternate with the teeth, 1 mm long. Disk cylindrical, 1.7 mm long, truncate. Ovary densely hirsute; style short, glabrous; stigma disciform, 1 mm in diameter. Fruit narrowly pyriform, about 2 cm long, obtuse, somewhat sulcate when dry, dehiscent, densely brown-lepidote.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1221, 1100*, September, June, 1907.

A species allied to *Dysoxylum cumingianum* C. DC., readily distinguished however by its many-jugate leaves, racemose inflorescence and quite different fruits.

ELAEOCARPACEÆ.

ELAEOCARPUS Linn.

Elaeocarpus octopetalus Merrill sp. nov.

Arbor ca. 23 m alta; foliis elliptico-ovatis, glabris, coriaceis, subintegris, ca. 20 cm longis; racemis axillaribus, solitariis; floribus ca. 1 cm longis, sepalis 8, extus dense cinereo-pubescentibus, petalis 8, integris; antheris aristatis; ovario 2-loculari.

A tree about 23 m high, glabrous except the inflorescence, the branches terete, rather thick, gray or brownish. Leaves elliptical-ovate, 16 to 20 cm long, 7 to 11 cm wide, glabrous, coriaceous, shining, base acute, apex broadly short-acuminate, acumen blunt, the margins very obscurely crenate or entire; nerves about 9 on each side of the midrib, prominent, the reticulations rather dense; petioles 5 to 7 cm long. Racemes axillary, solitary, 7 to 9 cm long, the rachis, pedicels and sepals densely appressed-gray-pubescent. Pedicels about 1 cm long, in fruit 1.5 to 2 cm long, bracteoles none or fugacious. Sepals 8, lanceolate, somewhat acuminate, valvate, about 11 mm long, 3 mm wide, keeled and glabrous inside, except along the somewhat pubescent margins. Petals 8, lanceolate, induplicate, about 8 mm long, 3 mm wide, densely villous, especially inside, acute or acuminate, entire. Stamens about 40; filaments 1.5 mm long; anthers linear, minutely scabrid, somewhat curved, about 4.5 mm long, the apex aristate, the awn nearly 1.5 mm long. Ovary ovoid, densely villous, 2-celled, each cell several-ovuled. Fruit ovoid, glabrous, shining, dark blue, about 1.3 cm long, 8 or 9 mm in diameter, obtuse, with a bony 1-celled stone.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1148*, September, 1907. A very characteristic species, differing from all others in the genus in its 8 petals and sepals, for which a new section is necessary, which I call **Octelaeocarpus.**

Elaeocarpus mindanaensis Merrill sp. nov. § *Dicera.*

Arbor parva, ramis ramulis foliis racemis calycibusque plus minus dense ferrugineo-pubescentibus; foliis elliptico-ovatis vel oblongo-ovatis, acuminatis, nervis utrinque ca. 8; racemis axillaribus, multifloris; petalis 5, fimbriatis, extus basi parce villosis; staminibus obtusis; ovario 3-loculari.

A small tree, rather densely pubescent, the branches terete, glabrous in age, the younger parts densely ferruginous-pubescent. Leaves subcoriaceous, elliptical-ovate to oblong-ovate, 8 to 16 cm long, 4 to 8.5 cm wide, the apex acuminate, base acute to somewhat rounded, the margins irregularly crenate-dentate, the teeth small, glabrous above in age, except on the pubescent midrib and nerves, beneath rather densely pubescent; nerves 8 on each side of the midrib, very prominent beneath, the reticulations also very distinct; petioles densely pubescent, 2 to 3.5 cm long. Racemes axillary, solitary, 10 cm long or less, the rachis, bracteoles, pedicels and sepals densely pubescent. Pedicels about 8 mm long, each subtended by a deciduous linear 8 or 9 mm long bracteole, each bracteole with two or three small lobes. Sepals oblong, 6 mm long, 3.5 mm wide. Petals about 7 mm long, cuneate, glabrous except for a few hairs on the lower portion outside, fimbriate to the middle. Stamens about 30; filaments about 1.5 mm long, minutely pubescent; anthers narrowly oblong, scabrid, about 1.7 mm long, the cells equal, obtuse, not at all produced and with no terminal tuft of hairs. Ovary ovoid, densely villous, 3-celled; style villous below, attenuate, about 4 mm long. Fruit narrowly ellipsoid or oblong-obovoid; red when fresh, 2 to 2.5 cm long, about 1.2 cm thick, densely ferruginous-pubescent, acute or obtuse, 1-celled, the walls thick and bone-like.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 910*, April, January, 1907, also without numbers, May, June, and September, 1907.

A species well characterized by its uniform and dense pubescence.

MALVACEÆ.

HIBISCUS Linn.

Hibiscus paludosus Merrill sp. nov. § *Furcaria.*

Suffruticosus, erectus, omnibus partibus densissime fulvo-hirsutis; ramis ramulis foliisque subtus ad nervos plus minus aculeatis; foliis coriaceis, longe petiolatis, cordatis, 3- ad 5-lobatis, 5 ad 7 cm longis latisque; floribus purpureis, axillaribus, pedunculatis, solitariis, ca. 5 cm longis; bracteis 10, 1 ad 1.5 cm longis, linearibus, simplicibus.

Suffrutescent, erect, branched, very densely fulvous-hirsute throughout, the indumentum stellate. Branches terete, aculeate. Leaves orbicular to ovate, 5 to 7 cm long and wide, base cordate, usually 3- to 5-lobed, the lobes broad, ovate, acute, the margins denticulate, both surfaces very densely fulvous-stellate-hirsute, beneath on the nerves with a few scattered small spines, coriaceous; nerves distinct; petioles 10 cm long or less, densely hirsute and more or less aculeate. Flowers axillary, solitary, purple, their pedicels stout, about 5 mm long. Bracteoles 10, linear, 1 to 1.5 cm long, simple, densely hirsute. Calyx lobes 1.5 cm long, 6 or 7 mm wide at the base, gradually narrowed to the acuminate apex, hispid, glandular, the mid-nerve and the lateral marginal ones very prominent. Petals about 5 cm long, 2.5 cm wide, inequilaterally obovate, much narrowed below, more or less hispid outside, densely so at the base inside, strongly about 15-nerved. Staminal column about 3 cm long, antheriferous throughout; filaments 1.5 mm long; anthers 1 mm long. Fruit ovoid, acuminate, about 1.5 cm long, densely hispid with long fulvous hairs. Seeds glabrous or nearly so, more or less compressed, angular, about 3 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 874*, November, 1906, also without numbers, January and June, 1907, in swamps.

A species manifestly allied to *Hibiscus diversifolius* Jacq., which is widely distributed in the tropics, differing from that species in its very dense, fulvous-hirsute indumentum, its pedicellate flowers and in its strongly hirsute mature fruits.

MELASTOMATACEÆ.

MEDINILLA Gaudich.

Medinilla monantha Merrill sp. nov.

Frutex epiphytica, glabra; floribus axillaribus, solitariis, longe tenuiter pedicellatis, 4-meris; foliis oppositis, sessilibus, acuminatis, lanceolatis, valde 3-nervis.

A glabrous epiphytic shrub. Branches slender, terete, reddish-brown or grayish. Leaves opposite, sessile, lanceolate, subcoriaceous, 3 to 4.5 cm long, 8 to 12 mm wide, base acute, apex long-acuminate, acumen rather slender, blunt, the margins somewhat revolute; nerves 3, very prominent, extending from the base to the apex of the leaf. Flowers axillary, solitary, on very slender 10 to 14 mm long pedicels, each pedicel bearing two pairs of linear 1 to 1.5 mm long bracteoles. Calyx cup-shaped, about 3 mm long and wide, with 4 linear, acuminate, 1 mm long teeth, contracted abruptly below into a 3 mm long pseudostalk, one pair of bracteoles at the base of the pseudostalk, one between these and the base of the pedicel. Petals and stamens not seen. Style 5 mm long. Fruit ovoid, about 4.5 mm long, 4 mm thick, glabrous, the calyx teeth persistent.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1136*, July, 1907, also, without number, September, 1907.

A very striking species, characterized by its small lanceolate 3-nerved leaves, and long-pedicellate, solitary, axillary flowers, the pedicels being supplied with two pairs of bracteoles, indicating that apparently the inflorescence is a reduced cyme. Allied to *Medinilla myrtiformis* Triana, but very distinct from that species.

Medinilla bicolor Merrill sp. nov.

Frutex erectus vel scandens; ramulis paniculis et subtus foliis plus minus ferrugineo-plumoso-stellato-tomentosis; foliis oblongis, 20 ad 30 cm longis, breviter acuminatis, oppositis, 5-nerviis; paniculis axillaribus, tenuibus, 13 ad 20 cm longis; floribus 4-meris.

An erect or scandent shrub, the branches gray, glabrous, terete, the branchlets more or less ferruginous-plumose-stellate-tomentose. Leaves opposite, oblong, short-acuminate, the base subacute or rounded, 20 to 30 cm long, 5.5 to 7 cm wide, subcoriaceous, when dry pale above and reddish-brown beneath, glabrous above, beneath rather densely ferruginous-stellate-plumose-tomentose; nerves 5, prominent beneath, the inner pair extending to the apex of the leaf, the outer pair to about the upper three-fourths, reticulations obsolete; petioles stout, 1 to 1.5 cm long, ferruginous-pubescent when young. Panicles axillary, slender, the rachis and branches rather densely stellate-tomentose, the hairs somewhat plumose, spreading, the rachis very slender, its branches spreading, slender, 1 to 1.5 cm long, each bearing about three flowers, the branches usually

in whorls of three, the bracts and bracteoles subulate, 1.5 to 3 mm long, the pedicels about 3 mm long. Calyx ovoid, about 5 mm in diameter, rugose when dry, the limb slightly produced, obscurely 4-toothed, glabrous. Petals 4, broadly irregularly obovate, 4 to 4.5 mm long, 3 to 3.5 mm wide, obtuse, glabrous. Stamens 8, subequal; filaments 2.5 mm long; anthers 3 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 514, 885*, April, 1906, January, 1907.

A species apparently allied to *Medinilla corallina* Cogn., of Borneo (ex descr.), well characterized by its ferruginous-stellate-plumose pubescence, the leaves reddish-brown beneath and pale above, and its slender panicles.

MELASTOMA Burm.

Melastoma lanaense Merrill sp. nov.

Frutex erectus, ramis ramulis petiolisque plus minus dense ferrugineo-hirsutis et squamulis parvis, ovatis vel lanceolatis, acuminatis, plus minus ciliatis, obtectis; foliis elliptico-ovatis vel late ellipticis, acuminatis, 5-nerviis, subcoriaceis, subtus plus minus hirsutis, et paleis numerosis lanceolatis, patulis, acuminatis, praesertim ad nervos obsitis; calycis lobis tubum aequantibus, dentibus subulatis, penicillatis, 2.5 mm longis alternantibus, paleolis lanceolatis, penicillato-acuminatis, plus minus denticulatis vel pauce fimbriatis, 2 mm longis, subpatulis, non fasciculatis, dense obtectis; floribus 5-meris, ca. 3 cm longis.

An erect shrub, the branches, branchlets and petioles rather densely ferruginous-hirsute and with numerous ovate or lanceolate, acuminate, somewhat ciliate, more or less spreading or appressed scales. Leaves elliptical-ovate to broadly elliptical, subcoriaceous, 8 to 17 cm long, 3 to 8.5 cm wide, apex acuminate, base acute, dull, above with numerous more or less appressed subulate scales, beneath more or less hirsute, and with scattered, ovate, more or less ciliate, usually appressed scales, especially on the nerves; nerves 5, prominent, the cross-nervules numerous, parallel, slightly curved; petioles 1.5 to 3.5 cm long. Flowers 5-merous, pink, usually in threes, short-pedicellate or subsessile. Calyx tube 1.5 cm long, 8 mm thick, the lobes 5, lanceolate, acuminate, 1.5 cm long, 4 mm wide, the alternating teeth linear-lanceolate, penicillate-acuminate, 2.5 mm long, 1 mm wide at the base, the margins more or less ciliate-lacerate, the tube and backs of the teeth densely covered with closely imbricate, lanceolate, penicillate-acuminate paleæ, about 2 mm long, 0.7 mm wide, their margins denticulate and often somewhat fimbriate, not fasciculate, their upper portions somewhat spreading. Petals obovate, 2.5 cm long, 1.8 cm wide, rounded, the apical margins ciliate-hispid. Anthers 7 mm long, the appendage to the connective about 1.4 mm long. Bracts and bracteoles, if any, caducous.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, July and September, 1907, and no. *836*, November, 1906.

MEMECYLON Linn.

Memecylon venosum Merrill sp. nov.

Arbor parva; ramulis tenuibus, tetragonis, angustissime 4-alatis; foliis subsessilibus, elliptico-ovatis, 6 ad 10 cm longis, valde acuminatis, basi late rotundatis vel cordatis, valde 3-nerviis, nervis lateralibus regulariter arcuatis; cymis axillaribus; floribus in apice ramulorum capitato-umbellatis.

A small tree, the branches terete, slender, reddish-brown, the branchlets slender, 4-angled and narrowly winged on the angles. Leaves subsessile, elliptical-ovate, coriaceous, shining, 6 to 10 cm long, 3 to 5 cm wide, the base broad, round or cordate, the apex strongly acuminate, acumen blunt, about 1 cm long; primary nerves 8 or 9 on each side of the midrib, very prominent, spreading, arcuate-anastomosing and forming a pair of lateral nerves, the reticulations coarse, very prominent; petioles very short. Cymes axillary, solitary, about 4 cm long, the peduncles 1.5 cm long, the branches whorled, each bearing a subglobose umbellate head of many flowers about 1 cm in diameter. Pedicels about 3 mm long. Calyx funnel shaped, truncate, 2 mm long and wide. Petals orbicular-ovate or subreniform, about 1.3 mm long, sometimes 1.5 mm wide. Filaments 2 mm long; anthers 1.2 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 432*, September, 1906, also three sheets without numbers, same date and locality.

A species closely allied to *Memecylon paniculatum* Jack, differing from that species in its differently shaped much more acuminate and shorter leaves, more prominent reticulations, and shorter inflorescence.

ARALIACEÆ.

BOERLAGIODENDRON Harms.

Boerlagiodendron mindanaense Merrill sp. nov.

Arbor glabra, 5 ad 6 m alta; foliis fere ad basin palmato 10–14-lobatis, coriaceis vel subcoriaceis, basi cordatis, lobis irregulariter et grosse incisis; floribus 5- vel 6-meris; fructibus in capitula ovoidea vel ellipsoidea 3 ad 4 cm longa congestis.

A tree 5 to 6 m high (Copeland), 10 m high (Clemens), glabrous throughout. Leaves 60 cm long or less, coriaceous or subcoriaceous, palmately 10- to 14-lobed, the lobes reaching nearly to the base, 8 to 15 cm wide, oblong, irregularly toothed and coarsely irregularly incised, acuminate, the base cordate; petiole 50 cm long or less, stout, with about three prominent crests at the base. Umbels compound, the peduncles stout, about 9 cm long, each subtended by oblong, coriaceous, about 3 cm long, more or less setose bracts, bearing at the apex a central sessile head of sterile flowers, subtended by bracts similar to the basal ones but shorter, and two lateral branches about 9 cm long, these lateral branches with a pair of ovate 1 cm long bracts at about the middle and each with a terminal head of perfect flowers 1.5 to 2 cm in diameter. Sterile flowers, in the middle sessile head, many, pedicellate, the pedicels 1 to 2 cm long, with numerous basal bracteoles. Perfect flowers in the lateral heads many, sessile, crowded in dense ovoid heads, subtended by numerous small bracteoles. Calyx somewhat funnel-shaped, more or less angular, 3 mm long, 2 mm thick, truncate. Petals 5 or 6, oblong, in bud 4 mm long. Stamens 5 or 6. Ovary 5- or 6-celled. Fruit crowded in dense ovoid or ellipsoid heads 3 to 4 cm long, 2.5 to 3 cm thick, the individual fruits narrowly obovoid, strongly 5- or 6-ridged, 5- or 6-celled, the ridges acute.

MINDANAO, District of Davao, *Copeland 464*, March, 1904: District of Zamboanga, *Ahern 398*, March, 1901: Lake Lanao, Camp Keithley, *Mrs. Clemens 1191*, September, 1907: District of Zamboanga, Sax River, *Williams 2150*, February, 1905. Specimens collected by *Hallier* near Zamboanga, Mindanao, and on Basilan Island in January and February, 1904, may prove to be the same species.

A species recognizable by its very large 10- to 14-lobed leaves and 5- or 6-merous flowers.

Boerlagiodendron clementis Merrill sp. nov.

Arbor vel arbuscula; foliis glabris, submembranaceis, 20 ad 30 cm longis, palmato 5–7-lobatis, lobis irregulariter grosse sinuatis, acuminatis, inflorescentiis subglabris vel glabris; floribus 4-meris.

A shrub or tree, glabrous or nearly so. Leaves 20 to 30 cm long, glabrous, submembranous, truncate or cordate at the base, palmately 5- to 7-lobed, the lobes reaching to within 3 to 5 cm of the base, the sinuses broad, rounded, the lobes 6 to 8 cm wide, irregularly toothed and each with two or three large lateral lobules, these lobules ovate to oblong, toothed, acuminate, 2.5 to 4 cm long; petioles about 40 cm long, and with three or four crests at the base. Umbels compound, the peduncles 10 to 12, 2 to 3 cm long, subtended at the base by numerous oblong, deciduous, coriaceous, strigose bracts 1 to 1.5 cm long, the peduncles nearly glabrous, bibracteolate at the apex and bearing a sessile central head of sterile flowers and two lateral branches 2 to 2.5 cm long, each branch bibracteolate at about the middle and bearing a dense globose head of perfect flowers 1 cm in diameter or less, the bracteoles in both kinds of heads minute or wanting. Perfect flowers sessile. Calyx oblong, about 2 mm long, 1 mm thick, more or less quadrangular, glabrous, truncate. Petals 4, in bud 3 mm long. Stamens 4. Ovary 4-celled. Sterile flowers pedicelled, pedicels about 5 mm long, glabrous, ovaries ovoid, 3- or 2-celled. Fruit ovoid, about 7 mm long, 4-sulcate and 4-angled, 4-celled.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 91*, January, 1906: *For. Bur. 3921 Hutchinson*, March, 1906.

A species recognizable by its 5- to 7-lobed leaves, nearly glabrous inflorescence, absence of bracteoles in the flower-heads, and by its 4-merous flowers. Among the Philippine forms most closely allied to an undescribed species from Luzon.

SCHEFFLERA Forster.

Schefflera macrantha Merrill sp. nov.

Inflorescentiis terminalibus; ramulis crassis, usque ad 20 cm longis, dense cinereo-leprosis; umbellulis breviter pedunculatis, 3–8-floris; floribus 9- vel 10-meris, pro genere magnis, calyce ca. 6 mm diam.; foliolis ca. 9, oblongis, acuminatis, 18 ad 23 cm longis, glabris.

Scandent, the ultimate branches 1 to 1.5 cm thick, glabrous, with numerous, imbricated, 1 cm long bracts, near the tip. Leaves alternate, petioles stout, about 30 cm long, glabrous, inflated at the base, the petiolules 5 to 6 cm long; leaflets about 9, oblong or oblong-ovate, coriaceous, glabrous, somewhat shining, base rounded, apex rather abruptly short-sharp-acuminate, entire; nerves about 18 on each side of the midrib, spreading, freely anastomosing, the reticulations and secondary lateral nerves nearly as prominent as the primary ones. Inflorescence terminal, the common rachis apparently not produced, the branches 20 cm long or less, thick, densely covered with scurfy, ashy or brownish scales, the flowers borne in small umbels scattered along the branches, 3 to 8 in each, the peduncles stout, 3 mm long or less, the pedicels about 5 mm long and like the flowers densely scurfy. Calyx cup-shaped, about 6 mm in diameter, truncate. Petals 9 or 10, thick, connivent, oblong-lanceolate, acute or acuminate, scurfy outside, 4 to 4.5 mm long, 1.5 mm wide. Stamens 9 or 10, the filaments very thick, 0.5 mm long; anthers ellipsoid, 2 mm long. Ovary 9- or 10-celled, upper portion above the calyx cone-shaped, truncate.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, in forests, altitude about 750 m, June, 1907.

A species well characterized by its large 9- or 10-merous flowers, densely scurfy inflorescence and 9-foliolate leaves.

Schefflera clementis Merrill sp. nov.

Glabra, inflorescentiis exceptis; ramis crassiusculis apices versus bracteis lanceolatis 5 ad 7 cm longis obtectis; foliis ca. 6-foliolatis, foliolis coriaceis lanceolatis vel oblongo-lanceolatis, caudato-acuminatis, integris, usque ad 23 cm longis; inflorescentiis terminalibus, paniculatis, ramis plus minus furfuraceis, 20 ad 40 cm longis; floribus umbellulatis, 5-meris.

Scandent, glabrous except the inflorescence, the branches thickened, gray, glabrous, and toward their apices covered with numerous light-gray glabrous lanceolate, coriaceous, 5 to 7 cm long bracts or persistent stipules. Leaves about 6-foliolate, the petioles 24 cm long or less; leaflets coriaceous, glabrous, shining, lanceolate to oblong-lanceolate, 16 to 23 cm long, 5 to 7 cm wide, entire, apex shortly caudate-acuminate, base rounded or acute; nerves spreading, the primary ones scarcely more distinct than are the secondary ones and the reticulations; petiolules 5 to 6 cm long. Rachis of the inflorescence somewhat elongated, the branches more or less furfuraceous, 20 to 40 cm long, each branch subtended by a linear-lanceolate, acuminate, pubescent bract, 1.5 to 2 cm long. Flowers numerous, disposed in many-flowered umbels, which are arranged along the primary branches, their peduncles 5 to 10 mm long, the pedicels slender, 3 to 4 mm long. Calyx disciform, about 1.7 mm in diameter, obscurely 5-toothed. Petals 5, ovate, 1.5 to 1.8 mm long, 1 to 1.3 mm wide, acute, 3-nerved, more or less united. Stamens 5; filaments 2.5 to 3 mm long; anthers 0.5 mm long. Ovary 5-celled.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, June, 1907, and *no. 366*, March, 1906.

A species well characterized by its thickened branches which bear numerous lanceolate bracts or persistent stipules, its elongated panicle-branches and rather large leaves. Apparently allied to *S. caudata* (Vid.) Merr., but very distinct from that species.

Schefflera mindanaensis Merrill sp. nov.

Glabra; foliis 8-foliolatis, foliolis submembranaceis, oblongo-ellipticis, acuminatissimis, basi cuneatis, margine irregulariter grosse sinuato-serratis, dentibus apiculatis; inflorescentiis terminalibus, paniculatis, pauce ramosis, ramulis usque ad 25 cm longis; floribus in umbellulis dispositis, 9-meris.

Glabrous throughout, scandent, the branches rather slender, light-gray. Leaves 8-foliolate, their petioles about 20 cm long, dark-brown, not inflated at the base, the petiolules rather slender, 2.5 to 5 cm long; leaflets submembranous, oblong-elliptical, somewhat shining, dark when dry, apex sharply acuminate, base cuneate, often slightly inequilateral, the margins rather strongly and irregularly sinuate-serrate, the teeth distant, apiculate; nerves about 8 on each side of the midrib, distinct beneath, the reticulations lax. Inflorescence terminal, its branches few, three or less, 20 cm long or less, spreading, the flowers arranged in 3- to 6-flowered umbels along the branches, the peduncles and pedicels slender, each 1 cm long or less. Calyx funnel-shaped, about 3.5 mm in diameter, truncate. Petals 9, oblong-lanceolate, 3 or 3.5 mm long, about 1.3 mm wide, somewhat connivent. Stamens 9; filaments 1 mm long, anthers about 1.5 mm long. Ovary 9- to 11-celled, the portion above the calyx a truncate cone.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September–October, 1906.

A species resembling in leaf characters *Schefflera insularum* (Seem.) Harms, but sufficiently distinct from that species.

Schefflera gigantifolia Merrill sp. nov.

Foliis ca. 7-foliolatis, foliolis oblongis, usque ad 40 cm longis, 15 cm latis, caudato-acuminatis, marginibus irregulariter grosse sinuato-dentatis; inflorescentiae ramis usque ad 60 cm longis.

Scandent, glabrous except the inflorescence. Leaves about 7-foliolate, the leaflets oblong, coriaceous, caudate-acuminate, base rounded or subacute, margins coarsely and irregularly sinuate-dentate, somewhat shining above, dull beneath, 25 to 40 cm long, 10 to 15 cm wide; nerves about 16 on each side of the midrib, very prominent beneath; petioles very stout, 65 cm long or less; petiolules 7 to 11 cm long. Complete inflorescence unknown, its branches stout, 60 cm long or less, scurfy, becoming nearly glabrous in infrutescence. Flowers in 10- to 20-flowered umbels which are racemosely arranged along the branches, their peduncles rather slender, scurfy, about 1.5 cm long, a single lanceolate, acuminate, 1 cm long bract at the base of each ultimate branchlet or peduncle; pedicels about 1 cm long. Calyx hemispherical, with 6 shallow truncate teeth. Petals and stamens not seen, probably 6. Ovary 6-celled; style short, cylindrical, 0.5 mm long. Fruit ovoid or ellipsoid, about 4 mm long, 6-sulcate, the resulting ridges acute.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 717, 931*, September-October, 1906, and February, 1907: Province of Misamis, Mount Malindang, *For. Bur. 4565 Mearns & Hutchinson*, May, 1906.

A most characteristic species, readily recognizable by its very large leaves and large inflorescence.

Schefflera gracilipes Merrill sp. nov.

Glabra; foliis ca. 8-foliolatis, foliolis oblongis vel oblongo-ellipticis, integris, acuminatis, usque ad 9 cm longis; inflorescentiis terminalibus, rhachidibus 4 ad 6 cm longis, ramis numerosis, 15 ad 25 cm longis, gracilibus; floribus minutis, 5-meris.

Scandent, glabrous throughout, the branches light-gray, terete, rather slender. Leaves about 8-foliolate, the petioles 8 to 10 cm long, slender, the stipules 8 mm long, clasping the stems; leaflets oblong to oblong-elliptical, rather sharply acuminate, base acute, entire, 5 to 9 cm long, 2 to 3 cm wide, coriaceous, shining; nerves 4 or 5 on each side of the midrib, not prominent, irregular, scarcely more distinct than are the secondary nerves and reticulations; petiolules slender, 2 to 4 cm long. Panicles terminal, the common rachis 4 to 6 cm long; branches numerous, slender, 15 to 25 cm long, each subtended by a lanceolate, acuminate, somewhat mealy bract 1 to 1.3 cm long. Flowers small, disposed in subcapitate 8- to 12-flowered umbels, the ultimate branchlets of the inflorescence or peduncles very slender, 2 cm long or less, each subtended by a small bracteole, the pedicels 2 mm long or less. Calyx small, about 0.8 mm in diameter, disciform, minutely 5-toothed. Petals 5, narrowly ovate, acute, 1.5 mm long, 0.8 mm wide, 3-nerved. Stamens 5; filaments 1 mm long; anthers about 1 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September-October, 1906.

A species well characterized by its elongate and very slender branches and ultimate branchlets, and by its minute flowers.

Schefflera obliqua Merrill sp. nov.

Glabra; *foliis* 5-foliolatis, foliolis late ovatis vel oblongo-ovatis, nitidis, integris, apice caudato-acuminatissimis, basi late truncato-obliquis, rariter subacutis; paniculis terminalibus, ramulis patentibus; floribus 5-meris, petalis coalitis.

Scandent, glabrous throughout, the branches somewhat thickened, gray, strongly lenticellate. Leaves 5-foliolate, their petioles 8 to 10 cm long, petiolules 3 to 12 cm long, that of the middle leaflet longer than the lateral ones; stipules 1 to 1.5 cm long, inflated, clasping; leaflets glabrous, shining, papyraceous, 10 to 20 cm long, 5 to 10 cm wide, broadly ovate to ovate-oblong, entire, the apex very sharply caudate-acuminate, the base various, usually very broad and truncate, oblique, the angles rounded, rarely subacute, the middle leaflet equilateral, the four lateral ones strongly inequilateral; nerves about 13 on each side of the midrib, not prominent, the reticulations obscure. Panicles terminal, the common rachis elongate, the lateral branches spreading, usually 15, about 20 cm long, elongate in fruit, the flowers in about 12-flowered umbels, the ultimate branchlets or peduncles 2 cm long, frequently with supplementary fascicles of flowers at about the middle, the pedicels 5 mm long or less. Calyx shallow, truncate. Petals entirely coalesced forming an ovoid mitre-like corolla 3 mm long and 3 mm in diameter, blunt at the apex. Stamens 5; filaments very short; anthers about 2 mm long. Ovary 5- or 6-celled; style none. Fruit ovoid, yellowish-red, somewhat fleshy, nearly 1 cm long, broad at the base, apex acute, 5- or 6-sulcate, the resulting ridges rounded.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 876*, in flower, January, 1907, in fruit March, 1907: Province of Surigao, Surigao, *Bolster 377*, August and October, 1906, specimens immature and somewhat smaller than the type, but manifestly the same species.

A most characteristic form, recognizable by its very peculiarly shaped leaves, large fruits and united petals.

Schefflera simplicifolia Merrill sp. nov.

Glabra, foliis simplicibus, foliolis lanceolatis vel oblongo-lanceolatis, acuminatis, usque ad 16 cm longis, margine irregulariter leviter repandis; paniculis terminalibus, ramis elongatis, paucifloris; floribus 5-meris, petalis liberis, reflexis.

Scandent, glabrous throughout, the branches slender, terete, light-gray. Leaves simple, the petiole 1.5 to 2 cm long, the petiolule very short. Leaves lanceolate to oblong-lanceolate, subcoriaceous, 9 to 16 cm long, 2 to 5 cm wide, apex acuminate, base rounded or subacute, margins slightly and irregularly repand; nerves not prominent, the primary ones scarcely differentiated from the secondary ones and reticulations. Panicles terminal, the common rachis 2 to 3 cm long, the branches few, usually in pairs, elongate, slender, the primary ones 8 to 13 cm long, each bearing at its apex 4 to 6 umbellately-disposed branchlets 1 to 3 cm long, these in turn bearing the 4- to 6-flowered umbels, the pedicels about 1 cm long. Calyx cup-shaped, truncate, 2 mm long. Petals 6, free, reflexed, glabrous, narrowly ovate, acute, 1.8 long, 1 to 1.2 mm wide. Stamens 6, alternating with the petals; filaments 0.5 mm long; anthers 1 mm long. Ovary 6-celled; style conical, very short. Fruit suborbicular or ovoid, about 5 mm long, apiculate, 6-sulcate, the resulting ridges subacute.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, in flower and fruit, September–October, 1907, and from the same locality *Mrs. Clemens 1143*, July, 1907.

A most characteristic species, at once recognizable by its simple leaves, diffuse panicles and 6-merous flowers, the petals free, reflexed. The only other species in the genus with simple leaves, known to me, is *Schefflera avenis* (Seem.) Harms, from Singapore.

Schefflera ovoidea Merrill sp. nov. § *Cephaloschefflera.*

Foliolis ca. 8, glabris, oblongis vel oblongo-ellipticis, breviter acuminatis, integris, usque ad 22 cm longis; fructibus in capitula densa ovoidea 3 ad 3.5 cm longa congestis, numerosis, loculis 8 vel 9.

Scandent, glabrous throughout. Leaves 8-foliolate, petioles elongated, petiolules 4 to 6 cm long; leaflets oblong to elliptical-oblong, glabrous, coriaceous, entire, somewhat shining, base acute, apex short-acuminate, 18 to 22 cm long, 8 to 10 cm wide; primary nerves about 10 on each side of the midrib, distinct beneath, spreading-ascending, the secondary nerves somewhat prominent. Complete inflorescence not seen, the branches, in fruit, very stout, 1.5 to 2 cm in diameter, 70 cm long, each bearing about 14 ovoid dense heads 3 to 3.5 cm long. Mature heads subsessile, the individual fruits indefinite, 8- or 9-celled, the free portions conical, truncate, angular, about 2 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1037*, May, 1907.

A species resembling *Schefflera blancoi* Merr., but differing from that species in its elongated branches, larger heads and more numerously-celled fruits, those in *S. blancoi* being usually, if not always, 5-celled. It is apparently more closely allied to *S. cephalotes* Harms, of the Malay Peninsula, than to *S. blancoi*, but seems sufficiently distinct from that species. The mature fruits or heads are very suggestive of those of some species of *Pandanus* in the group of *P. fascicularis* Lam.

ERICACEÆ.

RHODODENDRON Linn.

Rhododendron clementis Merrill sp. nov.

Arbor glabra; foliis subcoriaceis, elliptico-oblongis, obtusis, usque ad 16 cm longis, nitidis, subtus squamulis parvis notatis; floribus aurantiacis, 4.5 ad 5 cm longis latisque, glabris; staminibus 10, in parte inferiori plus minus pubescentibus; ovario oblongo, glabro, 5-loculari.

A tree, the branches terete, reddish-brown or grayish, the younger ones dark-reddish-brown, glabrous. Leaves elliptical-oblong, 9 to 16 cm long, 4.5 to 8 cm wide, subcoriaceous, shining, somewhat paler beneath, entirely glabrous above, beneath with numerous scattered small lepidote glands, the base acute, the apex usually broad, rounded, rarely subacute or obscurely acuminate; nerves about 10 on each side of the midrib, not prominent, somewhat ascending, reticulating; petioles stout, 1 to 1.5 cm long. Flowers orange-colored, 5 to 10 or more at the apices of the branches on a short stout rachis, the buds covered by numerous membranous, shining, deciduous, elliptical bracts about 3 cm long, forming ellipsoid heads 3 to 3.5 cm long; pedicels glabrous, 2 to 3 cm long. Calyx disciform, 5-toothed. Corolla glabrous, 4.5 to 5 cm long and wide, the tube about 2 cm long, somewhat broadened upwards, the lobes 2.5 cm long, 2 cm wide, elliptical-obovate, rounded. Stamens 10; filaments 2.5 to 2.8 cm long, more or less pilose below, glabrous above: anthers 5.5 to 7 mm long. Ovary oblong, glabrous, 5 mm long, 5-celled; style glabrous, 1 cm long; stigma capitate, 2 mm in diameter. Immature fruit glabrous.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 732*, October, 1906, also without numbers, November, 1906, and October, 1907.

A species characterized by its orange flowers, oblong-elliptical obtuse leaves, which are but slightly lepidote beneath, its glabrous ovaries, etc.

VACCINIUM Linn.

Vaccinium lanaense Merrill sp. nov.

Arbor vel arbuscula, glabra, epiphytica; foliis coriaceis, ovatis vel oblongo-ovatis, 6 ad 11 cm longis, acuminatis, basi valde 5–7-nerviis; floribus axillaribus, fasciculatis, parvis, corolla ca. 2 mm longa, cylindrica, glabra; fructibus ovoideis, 4–5 mm diam.

An epiphytic shrub or tree, glabrous throughout, the branches light-gray or pale-brown, terete. Leaves ovate to oblong-ovate, rarely ovate-lanceolate, 6 to 7 cm long, 2 to 6 cm wide, coriaceous, shining, apex rather strongly acuminate, base rounded to subacute, the margins entire, somewhat revolute; nerves basal or subbasal, prominent, 5, sometimes with an additional submarginal pair, the interior pair leaving the midrib shortly above the base and extending nearly to the apex of the leaf, the reticulations obscure; petioles stout, about 3 mm long. Flowers in axillary 2- to 5-flowered fascicles, the pedicels glabrous, 3 to 4 mm long, each subtended by a pair of small somewhat sheathing bracteoles. Calyx glabrous, 2 to 2.5 mm long, the limb short, somewhat spreading, the lobes broadly orbicular-ovate, acute or acuminate, about 0.7 mm long. Corolla glabrous, cylindrical, short, 2.5 mm long or less, the teeth broadly ovate, about 1 mm long. Stamens 10; filaments 1.5 mm long or less, slightly hirsute, the anthers about 1.2 mm long. Style glabrous, deciduous, 2 mm long; stigma capitate. Fruit ovoid, glabrous, 4 to 5 mm in diameter.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 431*, March and June, 1906, also without numbers, September–October, 1906, September, 1907, and October, 1907.

An epiphytic species, growing on *Ficus*, in leaf-characters, shape, size, texture and venation, very close to *Vaccinium apoanum* Merr., but entirely different in floral characters, well distinguished by its small entirely glabrous flowers.

RUBIACEÆ.

HEDYOTIS Linn.

Hedyotis parva Merrill sp. nov.

Frutex erectus, glaber, ca. 1 m altus; foliis lanceolatis vel oblongo-lanceolatis, 1 ad 2.5 cm longis, acuminatis, basi acutis, membranaceis, breviter petiolatis; floribus axillaribus, glomerato-verticillatis, subsessilibus, ca. 7 mm longis; stipulis setoso-acuminatis, subintegris vel pauce pectinato-setosis.

An erect much branched shrub, glabrous throughout, about 1 m high. Branches slender, brown or grayish, 4-angled, the branchlets gray or reddish-brown. Leaves lanceolate or oblong-lanceolate, membranous, 1 to 2.5 cm long, 5 to 10 mm wide, the base acute, the apex acuminate; nerves very faint, two or three on each side of the midrib; petioles 1 to 2 mm long; stipules short, setose-acuminate, subentire or slightly setose-pectinate. Flowers white, in few-flowered axillary sessile or subsessile fascicles or cymes, the bracts oblong, obtuse, foliaceous, about 3 mm long. Calyx tube ovoid, less than 1 mm long, the lobes oblong-ovate, about 1.4 mm long. Corolla about 6 mm long, the tube cylindrical, slightly pilose within, the lobes oblong-ovate, acute, about 1.5 mm long. Filaments 1.5 mm long; anthers 1 mm long. Capsule, including the erect calyx lobes, about 3 mm long.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4576 Mearns & Hutchinson*, May, 1906: Lake Lanao, Camp Keithley, *Mrs. Clemens 461*, April, 1906. NEGROS, Mount Silay, *For. Bur. 4234 Everett*, February, 1906; *Whitford 1519*, May, 1906; Canlaon Volcano, *Banks s. n.*, June, 1906.

A species with the general aspect of *Hedyotis microphylla* Merr., but with axillary sessile or subsessile inflorescence.

HYDNOPHYTUM Jack.

Hydnophytum angustifolium Merrill sp. nov.

Ramis tenuibus, usque ad 60 cm longis, diffusis, junioribus furfuraceis, plus minus angulatis; floribus axillaribus fasciculatis, minutis, ca. 2 mm longis; foliis coriaceis, lanceolatis vel anguste lanceolatis, glabris, 5 ad 10 cm longis, 6 ad 18 mm latis; nervis lateralibus obsoletis.

Tuber irregular, at least 15 cm in diameter, brown or grayish, unarmed. Stems several, diffusely branched, at least 60 cm long, gray or brown, slender, the branches elongated, the younger ones brown and furfuraceous, somewhat angled. Leaves lanceolate or narrowly lanceolate, 5 to 10 cm long, 6 to 18 mm wide, coriaceous, glabrous, sessile or subsessile, pale when dry, somewhat shining, gradually narrowed to both base and apex, the tip acute or blunt, the midrib prominent beneath, the lateral nerves obsolete or very obscure. Flowers fascicled, axillary, white. Calyx cylindrical, 1 mm long and wide, truncate. Corolla 2 mm long, inside slightly barbate at the middle. Anthers 0.7 mm long. Style 1.2 mm long. Fruit red, somewhat fleshy when fresh, 1 cm long or less, about 4 mm in diameter at the base, gradually narrowed upward, apparently 1-celled and with a single seed.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, May, June, 1907 and April, 1906: District of Zamboanga, San Ramon, *Copeland s. n.*, March, 1905.

A very characteristic species, readily recognizable by its narrow sessile leaves, the nerves of which are obsolete or nearly so, and its elongated fruits.

RANDIA Linn.

Randia olaciformis Merrill sp. nov.

Frutex scandens, inermis; foliis ellipticis vel elliptico-ovatis, glabris vel subtus in axillis barbatis, nitidis, acuminatis, subcoriaceis, 6 ad 9 cm longis; nervis utrinque 5, subtus prominentibus, ascendentibus; cymis 3 ad 4 cm longis, plus minus hirsutis, axillaribus terminalibusque; floribus albis, ca. 1.5 cm longis, hirsutis; corollae lobis imbricatis, ca. 10 mm longis; stigmatibus elongatis, integris.

A scandent unarmed shrub, the flowers white, turning yellow in age. Branches terete, slender, dark-colored, ultimately glabrous, the young branchlets more or less appressed-hirsute. Leaves elliptical to elliptical-ovate, glabrous, except beneath in the vein axils, which are usually barbate, shining, subcoriaceous, base rounded or acute, apex acuminate, 6 to 9 cm long, 3 to 5 cm wide; nerves 5 on each side of the midrib, prominent beneath, ascending, somewhat curved, the reticulations somewhat distinct, rather close, petioles 5 to 8 mm long, glabrous or somewhat pubescent; stipules oblong-ovate, acute, 5 mm long or less, usually somewhat pubescent, persistent. Cymes axillary and terminal, peduncled, 4 cm long or less, the peduncles, branches, pedicels, bracts, bracteoles and flowers somewhat hirsute. Calyx somewhat urceolate, 4 mm long, the limb with 5, oblong or elliptical, obtuse, 1.8 mm long lobes. Corolla tube cylindrical, 7 mm long, 2.5 mm thick, the lobes 5, imbricate and twisted, narrowly oblong, about 10 mm long, 2.8 mm wide, obtuse. Filaments short; anthers lanceolate, twisted, about 10 mm long, sparingly pubescent. Ovary 2-celled, each cell many-ovuled; style and stigma 18 mm long, the stigma cylindrical, elongated, entire, 8 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1220*, September, 1907.

A characteristic species, recognizable by its shining leaves with prominent ascending veins, which are usually barbate in the axils beneath, and by its cylindrical, elongated, entire styles. Very similar in gross characters to *Olax imbricata* Roxb., whence its specific name.

Randia pulcherrima Merrill sp. nov.

Frutex scandens, inermis, ca. 10 m altus; ramulis inflorescentiis et subtus foliis pauce hirsutis; foliis subsessilibus, coriaceis, oblongis, breviter acuminatis, basi auriculato-cordatis, 15 ad 20 cm longis, nervis utrinque ca. 10, prominentibus, supra impressis; cymis axillaribus, 5 ad 6 cm longis, densifloris; floribus pulcherrimis, roseis, crassis, 3 cm longis, petalis extus dense villosis, nitidis.

A scandent shrub about 10 m high. Branches unarmed, terete or slightly angled, light-gray or brownish, glabrous, the branchlets sparingly ferruginous-hirsute. Leaves coriaceous, oblong, 15 to 20 cm long, 5 to 7 cm wide, somewhat shining, glabrous above, slightly hirsute on the midrib and nerves beneath, short-acuminate, the base somewhat narrowed and prominently auriculate-cordate, subclasping; nerves about 10 on each side of the midrib, very prominent on both surfaces, impressed above, anastomosing, the reticulations lax; petioles very short, stout, not exceeding 2 mm in length. Cymes axillary, usually solitary, 5 to 6 cm long, somewhat ferruginous-hirsute, densely flowered. Flowers pink, 3 cm long. Calyx nearly 1.5 cm long, narrowly funnel-shaped, slightly hirsute, truncate and with 5 minute obscure teeth, about 5 mm in diameter at the mouth. Corolla-tube about 1 cm long, and with the lobes very densely pale-appressed-villous outside, the throat inside densely hirsute. Ovary 2-celled, each cell many-ovuled; style and stigma nearly 3 cm long, the stigma narrowly oblong, entire. Fruit ovoid or ellipsoid, glabrous, nearly 1.5 cm long when mature.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 765*, September, 1906, and without number, March, 1907. LUZON, Province of Tayabas, *For. Bur. 7863 Curran & Merritt*, November, 1907; *Elmer 9127*, May, 1907.

A very characteristic species, recognizable by its densely flowered axillary cymes, long flowers, the corolla densely villous, pale and shining, and by its strongly nerved, subsessile and prominently auriculate-cordate leaves.

LASIANTHUS Jack.

Lasianthus clementis Merrill sp. nov.

Arbor parva vel arbuscula; ramis ramulis foliisque plus minus olivaceo- vel sordide fulvo-pubescentibus; foliis papyraceis, elliptico-oblongis, tenuiter acuminatis, basi acutis; nervis utrinque 5 vel 6, subtus prominentibus; stipulis deciduis; floribus axillaribus, solitariis vel fasciculatis, plus minus villosis, 3 mm longis, bracteis nullis vel minutis.

A shrub or small tree, the branches and branchlets slender, terete, densely olivaceous or dirty-yellowish or brownish-pubescent. Leaves papyraceous, elliptical-oblong, rather abruptly slenderly acuminate, base acute, 7 to 9 cm long, 2 to 4 cm wide, somewhat shining, glabrous above, beneath more or less densely olivaceous-pubescent on the midrib nerves and reticulations; nerves 5 or 6 on each side of the midrib, prominent

beneath, curved-ascending, the reticulations subparallel, distinct; petioles pubescent, 2 to 3 mm long; stipules deciduous. Flowers axillary, solitary or two or three in an axil, sessile or subsessile, white. Calyx villous, 2 mm in diameter, 5-toothed. Corolla-tube cylindrical, about 3 mm long, somewhat pubescent, the lobes 5, rarely 6, spreading, villous, ovate-lanceolate, 2 mm long; anthers about 1 mm long. Ovary 5-celled. Fruit bright-blue, subglobose, 3 or 4 mm in diameter, slightly hirsute. Bracts none or minute.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 561*, *846*, May and November, 1906, and without number, September, 1907.

A species well characterized by its olivaceous or dirty-yellowish pubescence, sessile flowers, and absence of bracts.

WILLIAMSIA Merrill gen. nov.

Flores hermaphroditi. Calycis tubus ovoideus vel globosus; limbus 4- rarius 5-dentatus, persistens. Corolla coriacea, tubo brevi, fauce villosa; limbi lobi 5–7, valvati. Stamina 7, corollae fauce inserta, filamentis brevibus; antherae dorso affixae. Discus tumidus, annularis. Ovarium 5–7-loculare; stylus brevis, apice 5–7-lobatis. Bacca 5–7-locularis, polysperma. Semina minuta. Arbor parva, fere glaberrima. Folia opposita, petiolata, oblongo-lanceolata, acuminata, penninervia. Stipulae elongatae, intrapetiolares. Flores axillares, sessiles, solitarii vel fasciculati; bracteis 2, superpositis, plus minus cupularibus, 4-dentatis, involucrantibus.

Williamsia sablanensis (Elmer) Merrill comb. nov.

Urophyllum sablanense Elmer Leafl. Philip. Bot. 1 (1906) 39.

LUZON, Province of Benguet, Sablan, *Elmer 6131*, April, 1904 (type); Baguio, *Elmer 8551*, March, 1907; *Williams 1028*, October, 1904. MINDANAO, District of Zamboanga, *Copeland 1642*, February, 1905; Sax River, *Williams 2336*, February 15, 1905: Lake Lanao, Camp Keithley, *Mrs. Clemens 531*, May, 1905, and without number, July, 1907.

This new genus is manifestly allied to *Urophyllum*, but is at once distinguished from that genus by its sessile, axillary, solitary or fascicled flowers, and the presence at the base of the calyx of two cupular, imbricate, 4-toothed bracts, inclosing the base of the calyx, the lower one the smaller. It seems to be even more closely allied to *Gonyanera* Korth., but is readily distinguished from that genus by its more numerous ovary cells. Dedicated to Mr. R. S. Williams of the New York Botanical Garden, who made extensive botanical collections in the Philippines from October, 1903, to July, 1905.

NOTES ON PHILIPPINE GRAMINEÆ, III.

By E. HACKEL.

(*Attersee, Austria.*)

POLLINIA Trin.

Pollinia monantha Nees, var. **leptathera** Hackel var. nov.

Differt a typo rhacheos articulis pedicellisque in ½ inferiore brevissime ciliatis, gluma I apice saepe bidentula, in ½ inferiore dorsi leviter tantum sulcata, gluma II mutica, arista glumae IV capillari imperfecta flexuosa 8–15 mm longa.

SAMAR, flumine Catubig, *Merrill 5212*, Oct., 1906.

Pollinia monantha Nees, var. **Elmeri** Hackel var nov.

Differt a typo rhacheos internodiis pedicellisque pilis articulo 3-plo brevioribus ad apicem usque ciliatis, gluma II aristulata, arista glumae IV capillari imperfecta, flexuosa, circ. 6 mm longa.

LUZON, Prov. Benguet, Baguio, *Elmer 6524*, Junio, 1904.

PASPALUM Linn.

Paspalum longifolium Roxb., var. **trichocoleum** Hackel var. nov.

Differt a typo vaginis longe patentim villosis.

MINDORO, Calapan, *Bur. Sci. 941 Mangubat*, Junio, 1906. SAMAR, Caraga, *Merrill 5455*, Oct. 1906.

ISACHNE R. Br.

Isachne pauciflora Hackel, var. **hirsuta** Hackel var. nov.

Differt a typo foliis patentim hirsutis.

MINDORO, monte Halcon, *For. Bur. 4405 Merritt*, Junio, 1906.

Isachne pangerangensis Zoll. & Mor. var. **halconensis** Hackel var. nov.

Differt a typo (javanico) foliis parce pilosis vel glabratis, panicula latiore, spiculis longius pedicellatis (pedicello in spiculis subterminalibus quam spicula paullo in typo 3-plo) brevioribus.

MINDORO, monte Halcon, *Merrill 6221, 6203*, Nov., 1906.

PANICUM Linn.

Panicum heteranthum Nees, var. **pachyrhachis** Hackel var. nov.

Differt a typo rhachi spiculis latiore (1.5 mm lata, spicula 1 mm) spiculis e rhacheos excavationibus a latere vix prominentibus spiculis pedicellatis parce tantum et molliter villosulis.

LUMBACAN, *Merrill 5276*, Oct., 1906. PALMAS, *Merrill 5355*, Oct., 1906.

ERAGROSTIS Host.

Eragrostis reflexa Hackel sp. nov. § *Pteroëssa.*

Annua. Culmi erecti, graciles, ad 25 cm alti, compressi, glaberrimi, 3–4-nodes, e nodis omnibus praeter summum ramosi, ramis floriferis culmum aequantibus. Folia glaberrima. Vaginae compressae, internodiis multo breviores. Ligula margo membranaceus angustus, glabra. Laminae lineares, tenuiter acuminatae, planae, 5–10 cm longae, 2 mm latae, flaccidae, virides, tenuinerves, etiam margine laeves. Panicula ovali-oblonga, ad 10 cm longa, patentissima, interrupta, rhachis glaberrima, ramis solitariis brevibus distantibus tenui-filiformibus glaberrimis, inferioribus demum reflexis 3–4 cm longis inde a basi 4–8-spiculatis, superioribus brevissimis 1- vel 2-spiculatis angulo recto patentibus plus minus confertis. Spiculae superiores rhacheos ramorumque brevissime pedicellatae, omnes lineares, elongatae, saepe plus minus curvulae, a latere compressae, 20–40-flores, 10–20 mm longae, 2–2.5 mm latae, floribus patulis sese ad $\frac{2}{3}$ tegentibus. Glumae steriles subaequales, lanceolatae, acuminatae, fere 2 mm longae, uninerves, $\frac{2}{3}$–$\frac{3}{4}$ floris contigui tegentes, carina superne sparse aculeolatae. Glumae fertiles late ovatae, obtusae vel obtusiusculae, 2 mm longae, albidae, carina nervisque viridibus valde prominentibus scabrae, inter nervos minute scaberulae, demum deciduae. Palea persistens, oblonga, obtusa, curvula, carinis ciliolatis. Stamina 3; antheris minutissimis (0.2 mm longis).

Luzon, Prov. Rizal, prope Bosoboso, *Bur. Sci. 2067 Ramos.*

Valde affinis *E. distanti* Hack., quae differt culmo simplici, panicula maxima (circ. 25 cm longa) ramis elongatis (inferioribus ad 12 cm longis) patentissimis quidem sed non reflexis in $\frac{1}{4}$ inferiore nudis ramulos secundarios crebros 1- vel 2-spiculatos gerentibus, spiculis longius pedicellatis haud ita multifloris, a se invicem valde distantibus. Habitus inflorescentiae *E. reflexae* fere ille *E. zeylanicae* Nees, quae vero radice perenni culmo simplici, glumis fertilibus acutis aliisque notis abunde differt.

DENDROCALAMUS Nees.

Dendrocalamus parviflorus Hackel sp. nov.

Culmus ex collectore erectus, arboreus. Foliorum vaginae teretes omnino glabrae, scaberulae. Ligula brevissima, 0.5 mm longa, glabra. Laminae lineari-lanceolatae, acuminatae, 14–22 cm longae, 3–4 cm latae, basi in petiolum brevissimum (2–3 mm longum) contractae, rigidae, glabrae, subtus tenuissime asperulae, supra marginibusque laeves, subtus glaucescentes, nervo medio crassiusculo prominente, lateralibus primariis utrinque circ. 9, secundariis 3–5-nis, nullis anastomosantibus. Panicula ampla rhachi tereti laevi, ramis solitariis usque ad ternis elongatis (20–30 cm longis) gracilibus basi squamatis, internodiis 7–10 mm longis uno latere sulcatis glaberrimis, spicularum glomerulis parvis (6–8 mm latis) e spiculis 5–7 evolutis interjectis nonnullis hebetatis constantibus. Spiculae late ovatae, 5 mm tantum longae, 4- vel 5-flores, brunnescentes. Glumae steriles 2, inaequales, latissime rotundato-ovales, obtusissimae, 9–11-nerves, I spicula triplo, II ea duplo brevior. Glumae fertiles ambitu rotundatae, latiores quam longiores, obtusae, apiculatae, 17–19-nerves, nervis tenuissimis haud prominulis, infra apicem subcarinatae, dorso glaberrimae, margine ciliolatae. Palea glumam aequans, ovato-oblonga obtusa, bicarinata, rigidule ciliata, inter carinas tenuiter trinervis. Stamina 6; antheris 3 mm longis apiculatis.

MINDANAO, Lake Lanao, Camp Keithley, *Mary Strong Clemens*, Mart., 1907.

Valde affinis *D. flagellifero* Munro ! (ex Malacca) qui differt vaginis medio dorso appresse hirtulis, laminis versus basin prope costam mediam hirsutis, margine scaberrimis, nervis manifestioribus in sicco prominulis, paniculae ramis magis elongatis pendulis, internodiis 2–2.5 cm longis in latere sulcato pubescentibus, spicularum glomerulis circ. 1 cm latis internodio triplo brevioribus, spiculis circ. 7 mm longis, tota panicula laxiore, glomerulis magis distantibus. Munro dicet spiculas *D. flagelliferi* in genere minimas esse, sed speciei nostrae adhuc minores. Praeter hanc notam glabritiem foliorum ramorumque paniculae nullus fere discrimen, ita ut ejus dignitas fere potius subspeciei quam specifica.

SCHIZOSTACHYUM Nees.

Schizostachyum mucronatum Hackel sp. nov.

Rami graciles, teretes, glaberrimi, ramulosi, ramulis foliatis vel apice vel omnino spiculiferis efoliatis. Vaginae teretes, excepto ore longiuscule fimbriato glaberrimae. Ligula brevissima, subobsoleta. Laminae lineares vel sublanceolato-lineares, pedicello tenui circ. 4 mm longo bene distincto glabro fultae, longiores ad 16 cm longae 1 cm latae, in acumen subulatum attenuatae, glabrae, utrinque laeves, margine aculeolato-scaberrimae, supra virides, subtus glaucescentes, tenuiter chartaceae, nervo medio tenui, lateralibus primariis utrinque ternis, secundariis 5–7-nis omnibus tenuissimis haud anastomosantibus. Inflorescentia in specimine nostro incompleta, ramis fasciculatis inaequalibus, longioribus ad 20 cm longis, teretibus, glaberrimis. Spiculae in glomerulos subdistantes valde inaequales (aliae 3- vel 4-, aliae 8–10-spiculatae, 1–1.5 cm latae) dispositae, lineari-lanceolatae, 8–17 mm longae, in eodem glomerulo minores majoribus intermixtae, viridulae. Glumae steriles 3 vel 4, sursum accrescentes (I circ. 2 mm, II 3 mm, III 5 mm longae) ovatae vel infimae ovato-rotundatae, mucronatae, mucrone in III et IV usque ad 1 mm longo, 5–7-nerves, glabrae, omnes praeter infimam gemmiparae. Gluma fertilis a sterilibus internodiolo 1 mm longo separata, lineari-lanceolata, convoluta (evoluta late lanceolata), mucronata, 8–10 mm longa, 9-nervis, in ¼ superiore dorsi strigilloso-hispida. Palea glumam conspicue superans, ei simillima, arcte involuta, glabra vel infra apicem tantum hispidula, tenuissime 7–9-nervis. Lodiculae nullae. Stamina 6; antheris linearibus. Ovarium lineari-oblongum, longe rostratum; stylo elongato, stigmatibus brevissimis.

LUZON, Prov. Ilocos Sur, *For. Bur. 5659 Klemme*, Oct.–Nov., 1906.

Affine *S. Blumei* Nees quod differt foliis lanceolatis plicatulis, gluma fertili glabra.

LUMBAYAO (TARRIETIA JAVANICA BLUME).

By F. W. Foxworthy.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

Tarrietia javanica Blume Bijdr. (1825) 227; Rumphia 3 (1837) 194, *pl. 172 a, f. 1;* Miquel Fl. Ind. Bat. 2 (1856) 179; Koord. & Valet. Bijdr. Boomsoort. Java 2 (1895) 166.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9014*, *9377*, *9425 Whitford & Hutchinson*, November, 1907 to February, 1908. BASILAN, *For. Bur. 6091 Hutchinson*, July, 1906.

Java and Cochin China.

The timber known as lumbayao has been found in the Manila market at various times for some years past, but the botanical status of the plant producing it has previously been in doubt. Recently Dr. H. N. Whitford and Mr. W. I. Hutchinson, of the Forestry Bureau, encountered lumbayao in quantity on a timber concession at Port Banga, District of Zamboanga, Mindanao, securing ample material with both flowers and fruits, as well as wood specimens from the same trees, and from this material it has been possible for me to identify the tree as *Tarrietia javanica* Blume, a species previously known only from Java and Cochin China.

The tree is large, 25 to 45 m in height, usually with a trunk diameter of 60 to 80 cm, reaching a maximum of 120 cm. The boles are long and clear, reaching in extreme cases a length of 20 to 22 m, and frequently have buttress roots, while the bark scales off irregularly. (See Pl. I and II.) In the Port Banga region the trees occur scattered, but in some quantity, in a dipterocarp forest on or near the tops of the ridges of the low coastal hills.

The wood, according to Miquel, Fl. Ind. Bat. l. c., is "hard and white," Blume in Rumphia l. c., also speaks of it as hard and white and further states that because of its durability in water the natives value it for the construction of dugout canoes. Wiesner[1] says that the wood is bright- or dark-red, light and easily worked, but not durable, while Koorders & Valeton, l. c., say that it is reddish-brown, strong and durable, and much esteemed for the construction of houses. The statements as to its white color might well be due to the fact that only sapwood had been seen.

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[1] Die Rohstoffe des Pflanzenreiches 2: 112.

In a previous paper[2] I gave a brief account of this wood, but since additional material has been secured, and the identity of the tree established, it seems desirable to give a slightly modified and extended description of it.

Sapwood very light-colored. Heartwood light-brown to dark-brownish-red, soft to moderately hard or hard, moderately heavy. Seasonal rings distinct or rather obscure. Usually diffuse-porous (Pl. III, fig. 1) but sometimes falsely ring-porous by reason of traumatic influences, which have caused an alignment of large vessels at the inner edge of a season's growth. Pith-rays small or moderately large. Vessels medium size to large, single or several united, very frequently filled with a dark-red substance. Tangential section showing very distinct parallel transverse markings. (Pl. III, fig. 2.) The grain is not perfectly straight, but it is not so twisted as to seriously interfere with the working of the wood, indeed, the wood is rather easily worked and takes a very fine finish.

There are two other species of *Tarrietia* known from the Philippines, *T. sylvatica* (Vid.) Merr., an endemic species and very distinct because of its simple leaves, and *T. riedeliana* Oliver, known from Mindanao and Celebes. The former is widely distributed in the Archipelago, and its timber is commercially well known. The wood of the latter is unknown, but according to the collector's notes the tree is large and it is probable that its timber will prove to be of good quality.

The occurrence of two such good timbers as duñgon (*Tarrietia sylvatica* (Vid.) Merr.) and lumbayao (*T. javanica* Blume) in the Philippines makes the genus one of considerable importance here. Duñgon is very hard and heavy and is, of course, of the greater importance where strength and durability are required. It is a fairly good wood for furniture, but it does not take so good a finish as lumbayao, nor is it so easily worked. Lumbayao is well suited for the manufacture of furniture, because of its color, grain, and the ease with which it is worked. It is particularly handsome when quarter-sawed, and should be a very satisfactory wood for paneling and cabinet work.

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[2] *This Journal* **2** (1907) *Bot.* 387.

ILLUSTRATIONS.

PLATE I. *Tarrietia javanica* Blume, showing the long clear bole. (Photograph by Whitford.)

II. *Tarrietia javanica* Blume, a close view, showing the bark characters. (Photograph by Whitford.)

III. Fig. 1. Cross section of the wood × 5. (Photograph by Martin.) Fig. 2. Tangential section of the wood × 5, showing the parallel transverse markings. (Photograph by Martin.)

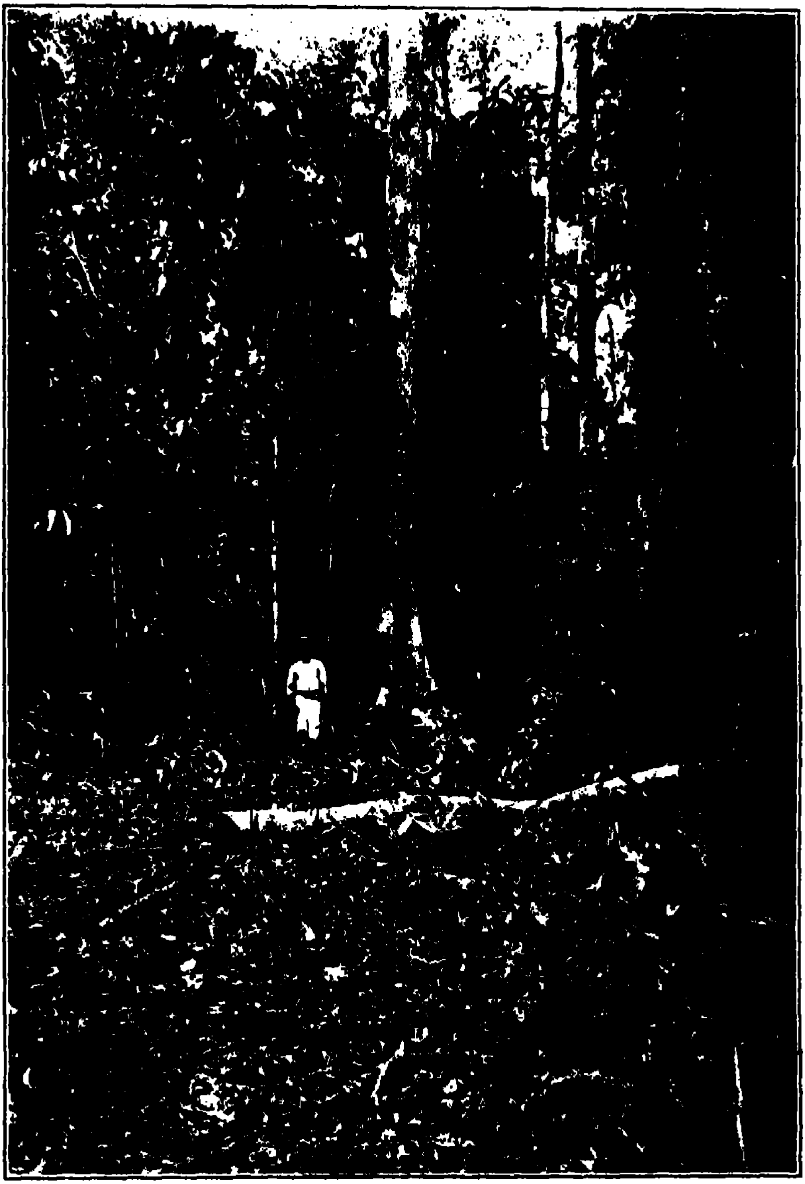

PLATE I.

PLATE II.

FIG. 1.

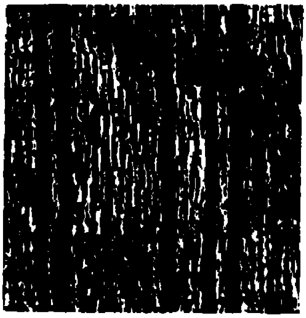

FIG. 2.

PLATE III.

The Philippine Agricultural Review

A MONTHLY ILLUSTRATED REVIEW PRINTED IN ENGLISH AND SPANISH AND PUBLISHED BY THE BUREAU OF AGRICULTURE FOR THE PHILIPPINE ISLANDS.

Edited by G. E. NESOM, Director of Agriculture.

The Philippine Agricultural Review, a newly established publication of the Bureau of Agriculture, will take the place of the press bulletins heretofore issued by that Bureau. It will not be a technical journal, but rather a popular serial publication on general agriculture. The primary object of the *Review* is to furnish an educational means of reaching the people of the Philippine Islands with the work of the Bureau of Agriculture.

The first number of the *Review* is devoted entirely to the annual report of the Bureau of Agriculture for the past fiscal year. This report is so published for the purpose of giving to persons interested in Philippine agriculture a comprehensive idea of the organization, scope, and extent of the work of that Bureau. Succeeding numbers will contain reports on agricultural conditions in different parts of the Philippine Islands, articles on tropical agriculture, and other material of interest to readers of agricultural literature.

Volume I, beginning January, 1908, will be issued monthly, and will be circulated free of charge in the Philippine Islands. A limited number of copies will be sent free to foreign workers along agricultural lines in recognition of valuable services rendered the Bureau of Agriculture. Should there appear to be a demand for regular foreign subscriptions, arrangements will be perfected later for furnishing them at a reasonable price.

Persons receiving the Philippine Agricultural Review are invited to submit material for publication. Any reports, articles, or notes on agricultural subjects will receive careful consideration and, as far as practicable, will be published.

Applicants for the *Review* should state whether the English or the Spanish edition is desired. Address all communications relative to this publication to the DIRECTOR OF THE BUREAU OF AGRICULTURE, MANILA, P. I.

THE PHILIPPINE
JOURNAL OF SCIENCE,
C. BOTANY

VOL. III AUGUST, 1908 No. 4

ALABASTRA PHILIPPINENSIA, II.

By C. B. ROBINSON.
(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

During the years 1903–1905, Mr. R. S. Williams made a collection aggregating 3,126 numbers of Philippine plants for the New York Botanical Garden, where the phanerogams with the exception of certain families were placed in my hands for study. Many of the orchids of this collection were reported upon by Oakes Ames, and several of them became the types of new species. The first paper of the present series [1] was also devoted to them, and therein some 12 species were described as new.

The localities represented were Lamao, Baguio and vicinity, and Los Baños, all in Luzon; Zamboanga and vicinity, and the country on the west coast of the Gulf of Davao and inland to Mount Apo, in Mindanao; and a few species came from Jolo.

Owing to the other large collections made at Lamao and in Benguet, the great majority of the species collected at these places have already been described, but there still remain a few even from Luzon, while the Mindanao plants furnish many novelties. Not all of these are here described, as several must await additional collections, especially in the case of dioecious species, or those represented by fruiting material only.

A nearly complete set of duplicates of this collection has been presented to the Bureau of Science through the kindness of Dr. N. L.

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[1] *Bull. Torrey Bot. Club* **35** (1908) 63–75.

Britton, director in chief of the New York Botanical Garden. Every one of the species here referred to from the Williams collection will be found at New York, and naturally when the material is unequally perfect, the more complete representation will be in the original set.

The first paper was worked out entirely at the New York Botanical Garden, the present embodies the results of work done there, with the further advantages of the comparison of material with the Philippine types in the herbarium of the Bureau of Science, and the assistance of many notes made by Mr. E. D. Merrill upon material in various European herbaria. While the plants of the Williams collection still form the chief basis for discussion, various other species have been reported upon.

JUNCACEÆ.

JUNCUS Linn.

Juncus leschenaultii J. Gay ex Laharpe in Mém. Soc. Hist. Nat. Par. 3 (1827) 137.

J. prismatocarpus leschenaultii (Gay) Buchenau in Engl. Bot. Jahrb. 6 (1885) 205.

This species, not hitherto reported from the Philippines, is represented by the following collections, all from Benguet Province, Luzon: *Williams 1974 bis*, Baguio, October 10, 1904; *Merrill 4739*, Pauai, border of a cold open swamp at an elevation of 2,040 m, November 8, 1905; *Bur. Sci. 4261 Mearns*, Pauai, at an elevation of 2,100 m, July, 1907; *Bur. Sci. 2791 Mearns*, without definite locality, April, 1907.

LILIACEÆ.

IPHIGENIA Kunth.

Iphigenia indica (Linn.) Kunth Enum. Pl. 4 (1843) 213.

Represented by *Williams 2962*, growing among grass on hillsides at an elevation of 120 m at Santa Cruz, District of Davao, Mindanao, in flower and fruit, June 19, 1905.

Not reported from the Archipelago in any publication devoted to Philippine botany, though so credited by J. D. Hooker in Fl. Br. Ind. 6 (1892) 357.

Distribution: Northwestern India to Australia.

MORACEÆ.

FICUS Linn.

Ficus copelandii sp. nov. § *Palaeomorphe*.

Arbor parva vel scandens: receptaculis sessilibus vel subsessilibus sed breviter pseudopedunculatis; floribus hermaphroditis perpaucis, tetrameris, stamine uno, ovarii rudimento parvo; floribus cecidioferis subsimilibus, stamine nullo; floribus femineis ignotis: foliis oblongis, papyraceis, basi inaequilateralibus acutisque, apice subito in acumen angustum obtusum mucronatum contractis, basi trinerviis; nervis lateralibus utrinque 8–11, distantibus subtus conspicuis.

Receptacles axillary, mostly in pairs, sessile or subsessile but prolonged into a pseudostalk 1–2 mm long, globose, 5–6.5 mm in diameter; pseudohermaphrodite and gall flowers in the same receptacles, but no female flowers seen: pseudohermaphrodite flowers very few, close beneath the ostiole; the perianth segments 4, oblanceolate, rounded at the apex, ciliate, purplish, 1.5 mm long, 0.4 mm wide; the solitary stamen and the ovary not, comparatively, equally developed in the flowers examined; the filament 0.3–0.8 mm long, rather stout, the anther oblong or obovate, 0.5 mm long; the rudimentary ovary with a stalk 0.6–1 mm long and 0.3 mm wide, the ovary itself 0.6–0.8 mm long, the style evident along its back almost from its base and projecting 2 mm or more from its middle or above; stigma very small, capitate; gall flowers except for the absence of the stamen very similar to the pseudohermaphrodite ones; very short-pedicelled, the perianth-lobes often more or less united, oblanceolate, often falcate, 1.5 mm long, 0.4 mm wide; the stalk of the ovary 0.6–1 mm long, the ovary 0.9 mm long, 0.6 mm wide, obovoid, the style as above.

Described by the different collectors as a tree attaining a height of 10 m, with a trunk diameter of 14 cm, or as growing on tree-trunks, the bark of the younger branches yellowish or brownish, striate, glabrous; the leaves borne on petioles 3–18 mm long, the lamina glabrous, entire, oblong or nearly so, 8–20 cm long, 3.5–8.2 cm wide, acute and inaequilateral at the base, at the apex abruptly contracted into a narrow acumen 8–15 mm long, obtuse and mucronate or retuse at the apex, bluish-green on the upper surface, beneath light-green with yellowish veins and very numerous minute papillae, 3-nerved at the base, lateral veins on either side of the midrib 8–11, with a few intervening ones nearly as prominent, the lateral veins well arched, reticulations only moderately numerous but conspicuous, especially on the under surface; stipules lanceolate, 3–3.5 mm long, 1 mm wide.

Type collected at an elevation of 100 m at San Ramon, District of Zamboanga, Mindanao, by E. B. Copeland, *No. 1606*, January 22, 1904; also represented by *Copeland 1637*, from the same locality, February 12, 1905; by *Williams 2097*, *2151*, from Sax River (practically the same locality), February 3–10, 1905; and by *Ahern 544*, from Tetuan, in the same district, May, 1901.

Ficus williamsii sp. nov. § *Eusyce*.

Scandens vel arbor; receptaculis axillaribus, pedunculis 6–10 mm longis; floribus masculinis pentameris, staminibus duobus; floribus femineis tetrameris, stylo ultra 1 mm, bifido; foliis lanceolatis, ellipticis, oblanceolatis, vel obovatis, basi acutis vel rotundatis, apice rotundatis, vel breviter vel mediocriter obtuse acuminatis.

Receptacles usually in pairs in the axils of present or fallen leaves, borne on slender peduncles which are 6–10 mm long, minutely pubescent, angled when dry; bracts at base of receptacles cupular, deeply divided into 3 semiorbicular lobes 0.8 mm long and 1.2–1.4 mm wide, rounded or slightly acuminate at the apex, ciliate on the margins; receptacles themselves subglobose, glabrous, strongly umbonate when dry, 6–8 mm long, 5–6.5 mm in diameter, the ostiole showing 6 or 7 rather conspicuous teeth; one set of receptacles containing female flowers only, the other, borne sometimes at least on the same branches, with male, gall, and immature gall flowers: male flowers about 20–25 in each receptacle, forming a band about 0.5 mm wide below the ostiole, on pedicels 0.6–0.7 mm long; perianth-segments 5, separate, blackish-purple, oblong, 0.7 mm long, 0.4 mm wide, acuminate at the apex, rounded at the base, pubescent within at the base, fleshy; stamens 2, the filaments usually united for about 0.2 mm, and the lower and smaller anther then very nearly sessile, the upper and slightly larger anther with a filament in all 0.5 mm long, but rarely in the same receptacle with filaments entirely free and anthers attaining a length of 0.5 mm, anther-cells 2, oblong, truncate or rounded at either end: supposed gall flowers sessile, the perianth very inconspicuous, sheathing the very base of the stalk of the ovary, the stalk 0.7–0.8 mm long; the ovary angled, irregular in outline, about 1 mm in length and diameter; the stigma small, lateral or subterminal: minute flowers also present, with flattened ovaries 0.3 mm in diameter, nearly oblong in outline, supposed to be rudimentary gall flowers: female flowers in receptacles slightly longer-pedunculate than the male, sessile, perianth lobes 4, broadly ovate, 0.7 mm long, 0.5 mm wide; ovary sessile, obovoid, 1.7 mm long, 1.2 mm wide, the style attached to the back nearly halfway to the top, 1.3 mm long and then divided into 2 diverging arms about 0.5 mm long.

Variable in habit, described as a vine, a bush, and a tree 6 m high with a stem 10 cm in diameter; bark of the older branches gray, of the younger brownish, striate, somewhat nodose, glabrous or very nearly so; leaves with minutely pubescent petioles 2–6 mm long, the lamina lanceolate, elliptic, oblanceolate, or obovate, 4–11 cm long, 1.7–3.6 cm wide, acute or rounded at the base, at the apex rounded, or shortly or moderately blunt-acuminate, revolute on the margins, coriaceous, glabrous, bluish- or yellowish-green on the upper surface, brownish and densely though minutely papillose beneath; midrib alone of the veins prominent, all other veins very thin, and obscure on both surfaces, primary veins on each side probably 7–10.

Type collected at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2355* (vine), February 12, 1905; also at San Ramon, in the same vicinity, by E. B. Copeland, *nos. 1618* (vine) and *1618a* (bush), February, 1905; and further represented by *For. Bur. 4676 Mearns & Hutchinson* (tree), Mount Malindang, Province of Misamis, Mindanao, May, 1906; and *Mrs. Clemens 1175*, and without number, Camp Keithley, Lake Lanao, Mindanao, September–October, 1907.

Closely allied to *Ficus oleaefolia* King, from Sumatra, but distinguished by its longer peduncles, longer-pedicellate male flowers, and its much more papillose leaves.

URTICACEÆ.

BOEHMERIA Jacq.

Boehmeria multiflora sp. nov.

Arbuscula (?), glomerulis spicatis vel rarissime ramos juniores amplectentibus erectis vel ascendentibus, dioicis; floribus masculinis ignotis; perianthio femineo tubuloso breviter bidentato arcte ovarium includente; stigmate longe exserto; foliis decussatis, lanceolato-ovatis, subcoriaceis, inaequalibus, longe petiolatis, caudatis, margine serratis.

Inflorescence consisting of many-flowered densely crowded and almost confluent spiked glomerules, or rarely surrounding young branches, the spikes 9–20 cm long, the glomerules wanting at the extreme base of the spike, usually 4–5 mm in diameter; dioecious, only female flowers present, these very short-pedicelled, in all 2.5–3 mm long; the perianth 1.4–1.7 mm long, closely inclosing but not adherent to the ovary, with 2 lobes 0.2–0.3 mm long at the apex, pilose; the pilose ovary narrowed in the basal 0.5 mm, there surrounding only the funicle of the oblong or ellipsoid 0.6 mm long ovule; stigma 1.5 mm long, exserted, linear, not articulated, pilose.

A branching plant with a woody stem 2.5 m high and 2.5 cm in diameter, conspicuously 4-grooved and somewhat angled, brown-tomentose and white-pilose; the leaves decussate, or on young branches alternate, those of a pair unequal, the longer having petioles with pubescence like the stem and 2.4–2.8 cm long, lanceolate-ovate, in all 9–13.5 cm long, 3.2–3.6 cm wide, at the apex caudate or barely acuminate, sometimes falcate, the base rounded, truncate, or most often subcordate, the shorter leaves with petioles only 8–11 mm long, similar to the longer ones but shorter-pointed, 6.5–7.2 cm long, 2.2–2.8 cm wide, all subcoriaceous, inequilateral or subequilateral, dentate-serrate on the margins except at the extreme base, the upper surface pubescent like the stem, not or barely scabrid, with abundant cystoliths, the under surface densely brown-tomentose with the veins pilose, 3-nerved at the base, the side nerves continuing from over one-half to two-thirds the length of the lamina, with 12–15 primary veins on each side of the midrib, more conspicuous above the middle of the leaf owing to their more abundant pubescence, secondary and tertiary venation with numerous anastomoses, immersed in the upper surface, very conspicuously projecting from the under; stipules linear-lanceolate, 8–9 mm long, long-pointed, keeled, deciduous.

Type collected at Baguio, Province of Benguet, Luzon, by R. S. Williams, *no. 1088*, June 6, 1904.

MAOUTIA Wedd.

Maoutia (?) planitora sp. nov.

Dioica; inflorescentiis femineis solum notis, singularibus vel geminatis, axillaribus, longe pedicellatis; receptaculis subplanis, lobatis, marginibus revolutis; floribus minutis, numerosissimis, in receptaculi pagina superiori crebrissimis, perianthio proprio nullo sed bracteatis; foliis alternis mediocriter vel longe petiolatis, ovatis, orbiculari-ovatis, vel ovalibus, trinerviis, subtus cinereo-tomentosis, supra glabris.

Pistillate inflorescence axillary, single or paired, with peduncles 1–3.5 cm long, the receptacle forming a flat disk with strongly revolute margins, 2-lobed, and the lobes again 2- or 3-lobed, usually so deeply that the whole appears at least 4-lobed, total diameter of receptacle attaining 3 cm: flowers very numerous, very small and densely crowded, but confined to the upper surface of the disk, reaching to its extreme margin and often reflexed with it: flowers sessile, with usually 3 linear to ovate ciliate bracteoles 0.3 mm long, but with no true perianth; ovary sessile, 0.7–0.8 mm long, with a subapical stigma 0.1 mm long, bearing a tuft of hairs; ovule rhombic-ovoid, apiculate, 0.5 mm long, 0.4 mm wide, peduncles and under side of receptacles appressed-strigose-pubescent.

A *bush* attaining a height of 6 m, with stems 7.5 cm in diameter, ultimate branches grooved, somewhat angled, near the apex quadrangular; the stems, especially near the apex, the petioles, and the veins of the under side of the leaves with appressed whitish-strigose hairs; leaves alternate, apparently without system in their variations of size, subequilateral, borne on flattened petioles 1.8–7 cm (usually 3.5 cm) long, ovate, orbicular-ovate or oval, in all 9–22 cm (the lamina usually 10–11 cm) long, 6.4–8.3 cm wide, acute or nearly truncate and entire at the base, from about the middle gradually rounded and terminating in an acute and mucronate acumen 1–1.5 cm long, the margins acuminately crenate or serrate except at the base, glabrous on the upper surface with numerous cystoliths, cinereous-tomentose on the under surface, the veins substrigose; 3-nerved at the base, the nerves continuing two-thirds to three-fourths of the length of the lamina, the next succeeding 12–15 lateral veins less conspicuous, then followed by 3 or 4 more prominent with a few less conspicuous intervening ones, the veins on the under surface of the leaf much more conspicuous than on the upper, yellowish or brownish; stipules lanceolate, appressed-strigose, 8 mm long, caducous.

Type collected at an elevation of 60 m at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2079*, January 31, 1905; also represented by an unnumbered specimen collected by E. B. Copeland at San Ramon, in the same vicinity, May 12, 1904.

This species is here provisionally referred to *Maoutia*, as that seems to be its nearest affinity, but the inflorescence is so different not only from that of this genus but from all others described that it is believed that this will prove to form a new, and, pending future possible discoveries, a monotypic genus. The flowers

are so small that it is difficult to arrive at certain conclusions regarding their nature; it is barely possible that there may be a perianth completely inclosing the ovary, but if so there are no visible teeth, and should the plant thus fall into another section of the family it is still apparently distinct from anything yet described. Further collections in the type locality will decide what its true position may be. *Maoutia reticulata* Weddell, from the Mariannes and the Philippines, collected in the latter by Née, is known with male flowers only, and from the description of the leaves might possibly be this species.

The inflorescence in some ways suggests rather the *Moraceae* than the *Urticaceae*, but its affinities seem to lie with the latter family.

ANONACEÆ.

POLYALTHIA Blume.

Polyalthia williamsii sp. nov.

Arbor parva; floribus solitariis–ternis, terminalibus vel rarius axillaribus; sepalis 3, valvatis, mitriformibus; petalis 3, subaequalibus, valvatis, subplanibus; staminibus circa 125, connectivo antheras excedente, foliaceo; carpellis circa 20, ovulis solitariis basilaribus, vel rarius duobus superpositis; foliis alternis, integerrimis, oblongis ellipticis vel ovatis.

Flowers solitary or two or three together, terminal or sometimes axillary, borne on peduncles 7–12 mm long and 1.4–1.8 mm thick; bracts cupular, sheathing the peduncles, 2 mm long, their apices about 1.5 mm below base of flowers, abruptly and sharply acuminate at the apex, with short and scattered reddish pubescence: sepals 3, valvate, mitriform, rounded or very shortly and obtusely acuminate and mucronulate at the apex, 6 mm long, 5 mm wide in middle, tapering to 3.5 mm at base, 0.5 mm thick at the middle of the base, decreasing in thickness upwards and outwards, ciliolate, with scattered reddish hairs on the middle of the back; petals 3, valvate, flat or nearly so, somewhat obliquely oval, 17.5–18.5 mm long, 8.5–11.5 mm wide, attached by the somewhat arching base 3–3.5 mm wide, not much thickened in the basal 5–6 mm, then swollen to a thickness of 1.5–4 mm except at the extreme edges, causing them to be sometimes almost triangular in section; stamens about 125 in number, arranged in 5 or 6 rows, 3.5–4 mm long, 1–1.2 mm wide, arching and dehiscing outwards, oblanceolate or narrowly oblong; connective prolonged beyond the anther-cells for about 0.5–0.7 mm, foliaceous, rounded at the apex, not as thick as the anther-cells: carpels about 20, 2.7–3 mm long, 1 mm wide in middle, the densely brown-tomentose ovary forming about two-thirds of the entire length, 1-celled, with one basal ovule, or in young ovaries apparently a second placed above the first but aborting early.

A small tree about 5.4 m high, with a trunk 6.2 cm in diameter, the bark of the ultimate branches greenish- to dark-brown, striate, glabrous: leaves alternate, the lamina entire, oblong, elliptic, or ovate, borne on petioles 5.5–11 mm long, acute or obtuse at the base, obtusely acuminate at the apex, bluish- or brownish-green on the upper surface, paler or glaucous beneath, 7–16 cm long, 3–6.1 cm wide, with 8–12, most frequently 9, pairs of primary veins, arched-anastomosing and forming a conspicuous inner and a less distinct outer marginal vein, secondary and tertiary venation also fairly conspicuous.

Type collected at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2306*, in flower, February 14, 1905. Also represented by *For. Bur. 9279 Whitford & Hutchinson*, from Port Banga in the same district, in flower, January 2, 1908.

CAPPARIDACEÆ.

CLEOME Linn.

Cleome gynandra Linn. Sp. Pl. (1753) 671.
C. pentaphylla Linn. Sp. Pl. ed. 2 (1763) 938.
Sinapistrum pentaphyllum Medic. ex Index Kew. 2 (1895) 914.
Pedicellaria pentaphylla Schrank in Roemer & Usteri Bot. Mag. 3 (1790) 8, 10.
Gynandropsis pentaphylla DC. Prodr. 1 (1824) 238.

This was described by Linnaeus in the first edition of the Species Plantarum as the second species of *Cleome*, but in the second edition he apparently considered that he had united three species under this name, and divided it accordingly, making *C. pentaphylla* the second of the three, but retaining under it every word of description and every reference cited under *C. gynandra*. The latter name was dropped altogether, but should be restored under the law of priority as now accepted.

The generic complications are so serious that no new combination will be proposed for it here, the object being rather to call attention to the position in which the matter appears to be placed according to the codes adopted at Washington and Vienna.

The only reference cited by Linnaeus in the fifth edition of the Genera Plantarum (1754) is *Sinapistrum* Tournef. *116*. This is not cited by him in either edition of the Species Plantarum, but it has been universally conceded to represent *C. gynandra*. Following the American code this would seem to be the type of the genus *Cleome* and no further departure would then be necessary than to revert to the original Linnaean name. But it would be obligatory to change the generic name of all the species now known as *Cleome*.

Under the Vienna code the state of affairs is even worse. In the list of exceptions, it is stated that *Gynandropsis*, although later, is to be preferred to the earlier *Pedicellaria* of Schrank. As always, it is not stated for what it is to be used, but that does not create any difficulty in the present case. However, no reference is made to *Sinapistrum* of Medicus in Philos. Bot. 1 (1789) 108, which antedates both *Pedicellaria* and *Gynandropsis*, and is not itself antedated by any genus of the same name as itself, published after the time of Linnaeus. The generic name *Sinapistrum* is accompanied by a diagnosis, and a single species is cited as referable to it, *Cleome pentaphylla* L. But no binomial was actually created under the new genus until and presumably inadvertently in the Kew Index. To those who consider that the absence of a binomial under a proposed new genus is a bar to its publication, the difficulty disappears, and a new combination will have to be created under the genus *Gynandropsis*. However, a description such as that of Medicus is not generally so discarded, and as *Sinapistrum* is not rejected by the letter of the Vienna code, however repugnant it may be to its spirit, it would be possible to create a series of new combinations to be buried in synonymy as soon as another congress of similar spirit has an opportunity to do so. No new name is here proposed, as it would only add to the complications which are already too numerous.

Considerations of usage or expediency alone can have led to the arbitrary rejection of *Pedicellaria* by the majority of the Vienna Congress, as it was monotypic, based professedly upon the Linnaean species, and published the new combination *Pedicellaria pentaphylla*.

The species is cosmopolitan in the tropics, and abundant in the Philippines, represented in the herbarium of the Philippine Bureau of Science by collections from the Islands of Luzon, Mindoro, Panay, and Mindanao (*Williams 2938*).

LEGUMINOSÆ.

INDIGOFERA Linn.

Indigofera nigrescens Kurz ex Prain in Jour. As. Soc. Bengal **67^2** (1898) 286.

LUZON, Province of Benguet, Kias Hill, *Williams 925*, flowers and fruit, September 11, 1904; Loakan, *Williams 1413*, fruit, October 18, 1904; Baguio, *Elmer 6582*, flowers, July 18, 1904; Pauai, *Bur. Sci. 4273, 4396, 4458 Mearns*, flowers, July–August, 1907; without definite locality, *Bur. Sci. 3462 Mearns*, flowers, July, 1907.

Distribution, Khasia Mountains, India, and southwestern China; not previously credited to the Philippines.

MUCUNA Adans.

Mucuna aurea sp. nov.

Scandens; foliis trifoliolatis, foliolis lateralibus late ovatis, basi truncatis, terminali rhomboideo; floribus circiter 5 cm longis, pedicellis aureo-tomentosis, crassis, 1.5–1.7 cm longis suffultis.

Inflorescence a somewhat zigzag raceme, at least 13 cm long, yellowish-tomentose with hairs about 0.5 mm long and others interspersed of rather deeper color 1.5–2 mm long, which are especially frequent upon the calyx; pedicels 1.5–1.7 cm long, 2–2.5 mm wide, linear-lanceolate, long-acuminate, borne singly or in pairs: flowers 5.5–5.6 cm long; calyx broadly campanulate, the tube 1.1–1.2 cm long, the lateral lobes semicircular, acuminate, or in all nearly triangular, 7 mm long, the basal lobe triangular, nearly 1 cm long, upper lobes united; petals 5, those of the keel clawed, subfalcate, acute at the apex, 5 cm long, 6.5–8 mm wide, glabrous except at the base and for occasional scattered hairs elsewhere, the basal three-fifths united; wings 5.2 cm long, 1.2–1.3 cm wide, clawed, rounded at the apex, slightly hastate near the base, tomentose on the basal fourth of the upper margin and in the outer lower basal corner; standard suborbicular, 2.7–2.8 cm long, 2.5 cm wide, cordate at the base; stamens 10, 4.8–5 cm long, all except the uppermost forming a tube for about 3.6 cm; pistil at anthesis 5.6 cm long, the ovary sessile, villose-tomentose, 9 mm long, the style filiform, tomentose, stigma small, capitate; ovules 3, oval to rhomboid: fruit unknown.

A vine with blackish bark, the youngest shoots, petioles, petiolules, and the under side of the leaves ferruginous-tomentose, older shoots and upper side of leaves less markedly but still distinctly pubescent; petioles 2.5–5.2 cm long, lateral petiolules 3–6 mm long, terminal petiolules 1.2–1.3 cm long; stipels linear, acute, 3.5–5 mm long; leaflets 3, the lateral broadly ovate, obtuse at the apex, 9–9.2 cm long, 6.1–6.3 cm wide, with 4 or 5 pairs of alternate lateral veins, terminal leaflet rhomboid, 7.2 cm long, 4.7 cm wide.

Type collected at Baguio, Province of Benguet, Luzon, by R. S. Williams, *no. 1292*, in flower, July 13, 1904.

SMITHIA Aiton.

Smithia ciliata Royle Illust. Bot. Himal. (1839) 201.

LUZON, Province of Benguet, Baguio, *Williams 970*, September 28, 1904; *Merrill 4267*, October 22, 1905; *Bur. Sci. 2502 Mearns*, April, 1907.

Not hitherto reported from the Philippines. Less widely distributed in the Archipelago than *S. sensitiva* Aiton, which has been collected in both Luzon and Mindanao.

STRONGYLODON Vogel.

Strongylodon pulcher sp. nov.

Scandens, lignosus; floribus fasciculatis in rhachidibus tuberculatis dispositis, pulchris, 3.5 cm longis, omnibus florum partibus purpureo-lineatis; foliis trifoliolatis, petiolo longo suffultis, foliolis lateralibus oblongis, valde inaequilateralibus, apice acuminatis, 11.5–13.3 cm longis, foliolo terminali lanceolato-ovato, 14.5–15 cm longo.

Flowers in fascicles of 1–3, borne on more or less persistent tubercles 1 mm long and 1.5 mm wide and usually winged by the ovate, 1.5 mm long, somewhat persistent bracts; the fascicles arranged on green or brown, glabrous rachises 6–7 cm long and 1.5 mm in thickness, apparently only on leafless stems or branches; peduncles of mature flowers 1.5–2.5 cm long, 0.2 mm thick, gradually decreasing in length towards the apex of the rachis; bracteole inserted at the base of the calyx, suborbicular, truncate at the base, 5–7-lined, the margins subhyaline, ciliate, the bracteoles at the tips of the flowering shoots especially conspicuous: calyx cylindric-campanulate, 7 mm long, 5.5 mm wide, green, villose, its lobes very short, ciliate, rounded; corolla attaining a length of 3.5 cm, varicolored; keel scimitar-shaped, 3.2 cm long, 3.5 mm wide, acute at the apex, contracted at the base into a claw 6–7 mm long; wings rather less than 2 cm long, including a claw 7 mm long, beyond it suddenly expanded into an oblong limb 6.5 mm wide rounded at the apex and auricled on the lower side of the base; standard 3.5 cm long, 1 cm wide, elliptic-lanceolate; staminal tube 4 cm long, marked like the calyx and petals with purplish longitudinal lines; pistil at anthesis ciliate-tomentose,

2.6 cm long, the pod then about 5.5 mm long and 1 mm wide borne on a stipe 6.5 mm long and contracted at the apex into a slender style, upper side of pod straight, lower side regularly curved; ovules 5, 0.5 mm long, oval to rhomboid, apiculate.

A vine with woody stems 5–6 mm in diameter, climbing into trees and hanging down in large masses, the bark greenish-grey, coarsely striate, somewhat angled, and with conspicuous lenticels, glabrous except the parts of the inflorescence stated: leaves trifoliolate, in all 25.7–26 cm long, petiole 8 cm to the insertion of the two lower leaflets, prolonged 2.2–2.4 cm to the articulation with the terminal leaflet, petiolules 6.5 mm long, the petioles, petiolules, and veins pale-straw-color, the lamina olive-green on the upper surface and dull green beneath, lateral leaflets oblong, very inequilateral, 11.5–13.3 cm long, 4–5.2 cm wide, truncate or rounded near the base, subcordate or subpeltate at the insertion of the petiolule, entire, with 7 or 8 pairs of primary lateral veins, forming a submarginal vein, which though faint at points along its length is conspicuous in the 2 cm long obtuse mucronate acumen: terminal leaflet 14.5–15 cm long, 6–6.3 cm wide, lanceolate-ovate, only slightly inequilateral with 11 pairs of lateral veins: scars of fallen stipules conspicuous.

Type collected at an elevation of 90 m at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2362*, in flower and young fruit, February 22, 1905. The only fruiting material is in the herbarium of the New York Botanical Garden.

BURSERACEÆ.

CANARIUM Linn.

Canarium fuscum Engler in DC. Monogr. Phan. 4 (1883) 116.

Although the original description of this species was drawn from a plant with immature flowers, it is possible to identify with it with considerable confidence *Williams 2181*, collected at Sax River, District of Zamboanga, Mindanao, in fruit, February 28, 1905, and *Williams 2870*, from Santa Cruz, District of Davao, Mindanao, also in fruit, June 1, 1905.

The leaves in both specimens are 3–4-jugate, and the leaflets are glandular-denticulate or entire upon the same tree. The drupe, hitherto unknown, is surrounded by a triangular calyx rounded between the angles and about 1.2 cm wide, within which is a thin disk 1 mm wide bearing indications of the former presence of six free stamens attached to its extreme upper margin. The drupe itself is sessile, 2.3–2.8 cm. long, 1.2 cm wide, 1-celled, 1-seeded, and crowned by the small capitate 3-lobed stigma; seed 1.6 cm long, 6.5 mm wide, with a brown testa.

A species not hitherto reported from the Philippines.

Canarium williamsii sp. nov.

Arbor; floribus cymoso-fasciculatis in rhachidibus axillaribus ferrugineo-tomentosis 30 cm longis racemose vel paniculate dispositis, trimeris;

petalis imbricatis, oblongis, staminibus 6, filamentis basi dilatatis tubum brevem efformantibus, disco nullo, ovarii rudimento sessili; foliis circa 80 cm longis, 6- vel 7-jugatis, imparipinnatis.

Flowers apparently dioecious, the staminate subsessile or borne on pedicels reaching 1.5 mm long, fasciculately disposed on simple or *branching peduncles 1–2.5 cm long (or very short at the apex)*, arranged along an axillary rachis about 30 cm long: calyx fleshy, 3-lobed, nearly cylindric, the tube about 4 mm long, the lobes nearly 2 mm long, broadly ovate, rounded at the apex; petals 3, white, imbricate, oblong, 7 mm long, 3.3 mm wide, rounded at the base, shortly and sharply acuminate at the apex, ferruginous-tomentose on the exposed portions of the back only; stamens 6, anthers linear, 2–3 mm long, filaments 1.7–2.5 mm long, linear, dilated at the base and forming a thin tube about 0.7 mm high; no proper disk; rudiment of ovary sessile, ovoid, 1.5 mm long, nearly glabrous except for a tuft of ferruginous hairs at the apex: flower-buds ellipsoid.

A tree 18 m high, with a trunk 22.5 cm in diameter, not resinous except the inflorescence; the ultimate branches, rachises, and sepals, the petioles, petiolules, the under surface and the veins of the upper surface of the leaflets densely ferruginous-pubescent or glabrescent, branchlets very pithy; leaves exstipulate, 6- or 7-jugate, odd pinnate, in all 79–82.5 cm long, the petiole tapering from a 6.5–9 mm wide dilated and clasping base to 1 mm at its apex, striate, flattened on its upper surface, petiolules 1.2–1.4 cm long, the lowest pair of leaflets inserted 23–23.5 cm from the base, succeeding pairs following at intervals of 8.5 cm, 7.8 cm, 7.5 cm, 6.3–6.8 cm, 5.8–6 cm, 5 cm (if any), respectively, and the terminal leaflet 3–3.3 cm; lowest pair of leaflets shorter than the others, apparently unequal, ovate, 15.5–18 cm long, at the apex abruptly narrowed into an obtuse acumen 3 cm long, truncate, rounded, or acute at the base, succeeding leaflets 23–35 cm long, 5–9.5 cm wide, elliptic or oblong-ovate; the upper surface of the lamina somewhat bluish-green, lateral veins on each side of the midrib 20–25, arched, forming 2 or 3 veins on the very margin, secondary and tertiary venation also conspicuous, margins of the leaflets entire or only slightly sinuate.

Type collected at an elevation of 120 m at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2111*, in flower, February 7, 1905.

From this species it seems impossible to separate, on the basis of existing collections, two unnumbered collections by Mrs. Clemens, from Camp Keithley, Lake Lanao, Mindanao, September, 1907. They are superficially distinct from Williams' plants in the size of the paler leaves, which are almost certainly mature but only about 40 cm long, with leaflets only 12–15 cm long. The floral characters are almost identical, and the number, shape, and venation of the leaflets is the same.

EUPHORBIACEÆ.

The Philippine history of this genus begins with the description of *Gluta orgyalis* by Blanco in the second edition of the Flora de Filipinas (1845). This species, which by its author's own statement was well known to Llanos, was subsequently and erroneously reduced by the latter to *Cneorum tricoccum* Linn., a species not found in the Philippines.

Vidal, in the atlas accompanying his Sinopsis de Familias y Generos de Plantas Leñosas de Filipinas, figured both kinds of flowers and the capsules of what he then supposed to be *Cleistanthus ferrugineus* Muell.-Arg. Naves, in the atlas accompanying the third edition of the Flora de Filipinas, figured what he believed to be *Gluta orgyalis* Blanco, reducing it doubtfully to *Cleistanthus patulus* Muell.-Arg. In the Novissima Appendix, Fernandez-Villar credited to the Philippines three species of this genus, *C. ferrugineus*, *C. pallidus*, and *C. myrianthus*, reducing to the first of these Blanco's species, which he considered represented by Naves' plate.

Rolfe, reviewing Villar's work, took exception to this identification, and published the new combination, *C. blancoi* Rolfe, based solely upon "*C. ferrugineus* F. Villar, l. c. p. 187, *t. 353*, non Muell.-Arg." It seems to the present writer that although *C. ferrugineus* F.-Villar was a mixture, that *C. blancoi* Rolfe should be held to be typified by Naves' plate.

Two years later, Vidal in the Revision de Plantas Vasculares Filipinas, again published the combination *C. blancoi*, this time with a description, and citation as synonyms of *Gluta orgyalis* Blanco and *Cleistanthus pallidus* F.-Vill. He states that he is by no means satisfied that Blanco's plant had been re-collected, but that his own specimen most nearly agreed with Blanco's description of any that he had seen. In view of the doubt, he preferred to name his plant for Blanco, rather than to transfer the latter's specific name to its correct genus. Obviously, *C. blancoi* Vidal should be typified by Vidal's description and the collections upon which the description was based.

In the Flora of British India, *Cleistanthus myrianthus* was credited to the Philippines.

Finally, the transfer of Blanco's name was made by Merrill, with the citation of *C. Blancoi* both of Rolfe and Vidal as further synonyms. In spite of this last fact, the use of the specific name implies that *C. orgyalis* Merrill should be taken as the equivalent of *Gluta orgyalis* Blanco.

It seems certain to the writer that *Gluta orgyalis* Blanco, *Cleistanthus blancoi* Rolfe, and *C. blancoi* Vidal are three distinct species. The plants collected by Curran, at almost the exact type locality, undoubtedly represent the first, and the last was based upon a specimen, of which a duplicate is preserved at Kew, and a fragment from this is in the herbarium of the Bureau of Science, well matched by another collection from near the type locality. But nothing in this herbarium sufficiently represents Naves' plate, which may well have been inaccurate; its closest match is a specimen which can not at present be distinguished from a species described from Singapore, but unfortunately published after *C. blancoi* Rolfe, which is here regarded as a doubtful species. Rolfe's species antedates Vidal's and following the Vienna code, the name *C. blancoi* could be shifted about from one species to the other, according to varying opinion as to the validity of the older. The writer, feels certain that the best plan here, as in all similar cases, is to reject the later name, and believes that no ambiguity will ever be possible if Vidal's species, which is certainly not that of either Blanco or Rolfe, is hereafter known by the name of the botanist who described it: it is accordingly here renamed *C. vidalii*.

KEY [2] TO THE PHILIPPINE SPECIES.

- Styles of the female flower 2-cleft.
  - Ovary and capsule more or less 3-lobed.
    - Ovary glabrous.
      - Leaves less than 5 cm long........ 1. *C. orgyalis*
      - Leaves at least 8 cm long.
        - Pairs of lateral veins 9–15.
          - Leaves 4 times as long as wide........ 2. *C. apiculatus*
          - Leaves about 3 times as long as wide........ 3. *C. myrianthus*
        - Pairs of lateral veins over 20........ 4. *C. cupreus*
    - Ovary more or less pubescent.
      - Leaves slenderly acuminate.
        - Pairs of lateral veins less than 10.
          - Venation prominent.
            - Capsules pubescent........ 5. *C. bridelifolius*
            - Capsules subglabrous.
              - Capsules very conspicuously reticulate........ 6. *C. venosus*
              - Capsules not conspicuously reticulate........ 7. *C. laevis*
          - Venation obscure........ 8. *C. vidalii*
        - Pairs of lateral veins more than 10.
          - Leaves abruptly acuminate........ 9. *C. everettii*
          - Leaves gradually acuminate........ 4. *C. cupreus*
      - Leaves shortly and broadly acuminate.
        - Leaves ovate........ 10. *C. ovatus*
        - Leaves elliptic or oblong........ 11. *C. decipiens*
  - Ovary and capsules not 3-lobed........ 12. *C. integer*
- Styles of the female flower 4-cleft........ 13. *C. quadrifidus*

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[2] For the purposes of this key it has been assumed that when the capsules show any traces of pubescence that the ovaries have been pubescent. The ovaries of *C. cupreus* being unknown, and the capsules being glabrous, it has been included under both divisions of the key. In the text the disk of the female flowers has been described as it was found. It is probable that the apparent lobes are the result of mechanical injury, caused by the expansion of the growing capsule.

1. **Cleistanthus orgyalis** (Blanco) Merr. Bur. Govt. Lab. Publ. (Philip.) 27 (1905) 75.

Gluta orgyalis Blanco Fl. Filip. ed. 2. (1845) 451.

Cneorum tricoccum Llanos in Mem. Real Acad. Ci. Madrid 4 (1859) 508; non Linn. Sp. Pl. (1753) 34.

Flowers monoecious, in axillary, scaly-bracted fascicles: male flowers borne on densely ferruginous-villose pedicels 1 mm long, calyx 3 mm long, divided for nearly 2 mm into 5 lanceolate obtuse lobes, glabrous; petals 0.8 mm long, obovate in outline, the claw 0.25 mm long, the lateral lobes comparatively short, the terminal lobe comparatively long, obtuse, obscurely denticulate; disk flat, inconspicuous; androgynophore 1 mm long, the filaments 0.5 mm long, the anther-lobes oblong, 0.6 mm long, 0.3 mm wide: rudiment of ovary fallen: female flowers not seen: fruiting calyx sessile, otherwise as in the male; disk forming 5 lobes 0.6 mm long, 1 mm wide, rounded at the upper outer angles, slightly incurved along the upper margin, and contracting to a subcentral apical acumen; capsules brown, glabrous, globose, 7 mm in diameter, borne upon a stalk 2.5 mm long, 3-lobed, 3-celled, each cell containing 2 seeds 4.5 mm long and 1.8 mm wide: testa brown, embryo 4 mm long, its radicle 1.5 mm long, width across the cotyledons when outspread 5 mm.

A slender, woody bush 1–2 m high, the bark of the ultimate branches grayish, slightly striate, glabrous; young shoots densely brown pubescent; leaves borne on pubescent petioles 1.5–2.5 mm long, the lamina lanceolate or narrowly elliptic or narrowly oblong, 2–4.6 cm long, 7–12 mm wide, acute at the base, the margins entire and near the base somewhat revolute, the apex obtuse or very obtuse, the upper surface of the leaves glabrous or on young leaves pubescent with long appressed hairs, the under surface lepidote; primary lateral veins 8–10.

LUZON, Province of Bulacan, Norzagaray, *For. Bur. 7169, 7174, 7175 Curran*, in fruit with an occasional very late flower, June 16, 17, 1907.

These specimens come from within a very few miles of Blanco's type locality, and agree with his description so very closely that they certainly represent his species. They do not at all agree with Naves' plate supposed to represent it, and are also different from *C. blancoi* Vidal.

2. **Cleistanthus apiculatus** sp. nov.

Arbor monoica, floribus fasciculatis, breviter pedicellatis, pentameris, sepalis lanceolatis, petalis parvis, obovatis, trilobatis, masculinis disco subplano, androgynophoro apice filamentis candelabriformibus et ovario rudimentario; femineis disco late libero margine dentato, ovario glabro; foliis coriaceis, anguste ellipticis vel lanceolatis, integris, basi acutis, apice acuminatis apiculatisque.

Flowers monoecious, yellow, in bracted axillary fasicles, borne on pedicels about 1 mm long, the calyx 3.5 mm long, divided for about two-thirds of its length into 5 lanceolate, obtuse lobes, 1 mm wide at their base and having a somewhat prominent mid-vein; petals 5, inserted on the throat of the calyx, each about 0.8 mm long, 0.4 mm wide near the apex, where it forms two lateral obtuse lobes and a short acute apical tooth, narrowed into a conspicuous claw at the base: male flowers with a disk covering the base of the calyx-tube and free for a very short distance, the androgynophore developing with age, attaining a length of 2 mm, the 5 filaments widely spreading from its apex, gradually decreasing in thickness upwards, 1 mm long; anthers attached above the middle of the back, 1 mm long, 0.7 mm wide, cordate at the base, the cells diverging very slightly; rudiment of the ovary at the apex of the androgynophore, 1.3 mm long, lanceolate: female flowers with a thin disk attached to the calyx for about 0.7 mm, and then free for 1 mm, its upper margin with a conspicuous tooth opposite each of the calyx-lobes and some smaller intervening ones; ovary ovoid, glabrous, 1.5 mm long, narrowed at the apex to a neck bearing 3 styles 1 mm long, which divide into 2 blunt arms for an additional 0.5 mm; ovary 3-celled, each cell containing 2 ovules which are ovate in outline, 0.5 mm long and 0.2 mm wide in diameter.

A glabrous tree 18 m high, with a trunk 20 cm in diameter, its bark reddish-brown, somewhat flaky, that of the ultimate branches brownish with scattered lenticels; leaves alternate, the petioles 6–8 mm long, the lamina coriaceous, entire, lanceolate or narrowly elliptic, 9–14 cm long, 2.5–4.3 cm wide, the margins slightly revolute at the acute base, gradually narrowed from the middle and prolonged for 2–2.5 cm into a slender apiculate acumen, sometimes merely acute on one side and then slightly falcate, the upper surface olivaceous, the lower surface brownish-green, both surfaces shining, the upper especially; pairs of primary lateral veins 9–11, both they and the finely reticulated secondary venation conspicuous on both surfaces, but the midrib much more prominent on the lower.

Type collected at an elevation of 165 m at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2356*, with flowers of both sexes, February 23, 1905.

3. Cleistanthus myrianthus Kurz For. Fl. Brit. Burma 2 (1877) 370?

Nanopetalum myrianthum Hassk. in Versl. Kon. Akad. Wetensch. 4 (1855) 140.

MINDORO, Baco River, *Merrill 1812*. MASBATE, Uson, *For. Bur. 1005 Clark*. BALABAC, Cape Melville, *Bur. Sci. 462 Mangubat.*

All three of the specimens cited have somewhat immature flowers and no capsules, but agree fairly closely in vegetative characters. The greatest difficulty in this identification is the real identity of *Cleistanthus myrianthus*.

Nanopetalum myrianthum is described as having leaves from the acute base oblong or oblong-lanceolate acuminate, rarely acute or obtuse, and a specimen from a tree cultivated at the Buitenzorg Garden agrees with this description. In Kurz's original description the leaves are said to be oblong to oblong-lanceolate, obtuse at the base, more or less acuminate. But Hooker in the Flora of British India says that they are narrowly linear-lanceolate acuminate base acute. These latter descriptions are entirely inconsistent, and it seems most improbable that Kurz and Hooker can have had the same species in view. The latter reports this species from the Philippines, and from his description it is highly probable that he may have done so as a reduction of *C. cupreus* Vidal, a specimen of which was in the Kew Herbarium at the time his description was published. The latter is quite different from that here identified as *C. myrianthus*. Kurz does not cite Hasskarl's species as a basis for his own, probably because of the restrictions placed upon him regarding the insertion of synonyms, and it may be possible that they are different. The Philippine plants here cited have leaves usually but not always wider than the Javan, the bases vary on the same specimen from widely rounded to acute, the Balabac plant agrees exactly in its leaf-apices, the other two are sharply acuminate. They usually have rather fewer lateral veins than the Javan, the former varying from 11–15, the latter from 13–16.

4. **Cleistanthus cupreus** Vidal Revis. Pl. Vasc. Filip. (1886) 235.

LUZON, Province of Rizal, Bosoboso, *Vidal 560* (not seen); San Mateo, *Vidal 588*; Pilea, *Bur. Sci. 3307 Ramos*, in fruit, June, 1907.

It seems advisable to add the following to Vidal's description: That, at least if represented by the specimen last cited, the capsules are glabrous, the fruiting calyces are borne on definite but very short pedicels, the total length of the calyx is about 2.5 mm, of which the lobes are 1.5 mm, the petals are obovate, about 0.5 mm long, rounded at the apex, and hardly forming a claw at the base; the disk is double; the inner thick, about 0.4 mm long, the outer is thin, 0.2 mm long, forming several lobes opposite each of the perianth-segments.

5. **Cleistanthus bridelifolius** sp. nov.

Arbuscula, floribus ignotis; calycibus fructiferis subsessilibus, capsula depresso-globosa, dense, fulvo-villosa, 3-lobata, 3-loculari; foliis breviter petiolatis, variis, basi subcordatis, apice breviter obtuseque acuminatis, subtus glaucis.

Fruiting calyces nearly sessile, solitary but probably originally fascicled in the axils of the leaves, surrounded by persistent pale-brown pubescent bracts: calyx 3.5–4 mm long, divided for 2 mm into 5, lanceolate to ovate, subacute or rounded, villous lobes; petals 5, 0.8 mm long, concave, when spread out 1 mm wide near their apex, crescent-shaped with the concavity upwards, the upper margin obscurely toothed, the claw 0.2 mm long; disk conspicuous, but its limb almost obsolete, 0.1 mm long, entire; capsule depressed-globose, somewhat densely covered with appressed fulvous pubescence, 8 mm long, 10–11 mm in diameter, 3-lobed, 3-celled, each cell with a single seed, but often showing a rudiment of another; seeds pyriform, 3 mm long, 2.8 mm in diameter, the cotyledons orbicular, 2.5 mm long, 2.3 mm wide, cordate at the base, the radicle 0.8 mm long, 0.4 mm wide.

A small tree 8 m high, its trunk having a diameter of 10 cm, the bark of the ultimate branches reddish-brown or grayish, striate, varying with age from densely ferruginous-villose to glabrescent; leaves borne on annulate-rugose, pubescent petioles 2–2.5 mm long, the lamina lanceolate, narrowly oblong or elliptic, 4–8.7 cm long, 1.2–3.1 cm wide, usually 5–6 cm by 2 cm, subcordate at the base, shortly and usually obtusely acuminate, glabrous on the upper surface except occasionally on the midrib, the under surface glaucous; primary lateral veins on each side of the midrib 7–9.

Type collected in dense level forest at an elevation of 5 m above the sea at San Vicente, Province of Cagayan, Luzon, by W. Klemme, *For. Bur. 7064*, May 7, 1907. Also represented by *Bur. Sci. 3131 Mearns*, Casiguran, Province of Isabela, Luzon, June. 1, 1907.

6. **Cleistanthus venosus** sp. nov.

Arbuscula monoica; floribus in capitulis paucifloris spicatis vel subspicatis foliose bracteatis dispositis, pentameris, calycis lobis lanceolatis acuminatis extus villosis; petalis ovatis, pedicellatis, sublobatis; fructibus 3-lobatis, 3-locularibus, ovulis 2; foliis anguste ellipticis vel oblongis, acuminatis, venis conspicuis.

Flowers borne in spicate clusters usually in threes except at the apices of the branches, each cluster subtended by a foliose bract 9–14 mm long and 3–3.5 mm wide, lanceolate or oblanceolate, acuminate, having a stipule 2.5 mm long on each side of its base; flowers of both sexes in same cluster, sessile or subsessile: male flowers with the calyx 4.5–5 mm long, divided for about three-fourths of its length into 5 valvate lanceolate acuminate lobes, rounded or retuse at the apex, appressed-villose on the outer side; petals 5, ovate, 3.5 mm long, 3.5 mm wide, at the base truncate and sharply contracted into a slender claw about 0.3 mm long, villose on the outer surface, towards the apex somewhat 3- or 4-lobed; disk cupular, 0.8 mm long, 5-angled, extra-stamineal, conspicuous; androgynophore 1–1.5 mm long, filaments 5, 0.8 mm long, anthers dorsifixed, introrse, oblong-lanceolate, cordate at the base, 0.7 mm long; rudimentary ovary borne at the summit of the androgynophore and surrounded by the anthers, ellipsoid, 1.3 mm long, including a stipe 0.2 mm long, contracted at the apex into a blunt beak: female flowers with bracts sepals and petals as in the male flowers and persistent in fruit, the disk conspicuously double, both wide, cupular or lobed; ovary subglobose, appearing to be about 2 mm in diameter, but really considerably less owing to the dense villose pubescence which covers it, 3-celled, each cell with 2 ovules 0.5 mm long; styles 3, united with one another at the base, each about 2 mm long, bifid at the apex: capsules strongly 3-lobed, 3-celled, 1–1.2 cm long, and of similar diameter, their surface covered with small vermicular lines except at the contracted base, more or less villose especially near the base and in the sinuses of the lobes; seeds 2, collateral, hardly developed beyond those in the ovary, ellipsoid, the embryo nearly the length of the seed, its cotyledons straight.

A small tree attaining 7.5 m in height, with a trunk 10 cm in diameter, the young bark grayish to brownish, slightly striate and lenticellate, glabrous except the parts of the inflorescence already noted and the villose youngest shoots; leaves alternate, borne on petioles 4.5–6.5 mm long, the lamina entire, subcoriaceous, narrowly elliptical or oblong, 10–18 cm long, 3–4.5 cm wide, rounded or acute at the base, at the apex somewhat abruptly contracted into a slender obtuse acumen usually about 1.5 cm long, glabrous on both surfaces, stipules as in the bracts; 7 or 8 pairs of primary lateral veins on each side of the midrib, not only these but the secondary and tertiary venation conspicuous on the under surface, and fairly evident on the upper.

Type collected at an elevation of 150 m at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2187*, with flowers of both sexes, March 4, 1905; also represented by *Williams 2186*, from the same locality, in fruit, February 28, 1905.

7. **Cleistanthus laevis** Hook. f. Fl. Brit. Ind. 5 (1887) 277.

From this species as represented in this herbarium by two specimens from the type locality, Singapore, it is at present impossible to separate *Bur. Sci. 2681 Ramos*, Bosoboso, Province of Rizal, Luzon, in fruit, May, 1907.

CLEISTANTHUS BLANCOI Rolfe in Jour. Linn. Soc. Bot. 21 (1884) 315.

Gluta orgyalis Naves in Fl. Filip. ed. 3 *pl. 453*: non Blanco Fl. Filip. ed. 2. (1845) 451.

Cleistanthus patulus Naves in Fl. Filip. ed. 3. (1877) *pl. 353*; non Muell.-Arg. in DC. Prodr. 15^2 (1862) 505.

C. ferrugineus F.-Vill. Nov. App. (1883) 187: non Muell.-Arg. in DC. Prodr. 15^2 (1862) 507.

This species was based upon a plate to which no plant so far represented by recent collections sufficiently corresponds to warrant definite identification. The plate is in all probability inexact, especially in figuring the fruiting calyces as at the extremity of a pedicel reaching 1 cm in length. Much the most probable identification would be with the plant placed above in *C. laevis*. If this should prove to be the case, Rolfe's name being the older must replace Hooker's, in the light of present evidence not only for the Philippine but also for the Malay plant. Such a step is entirely unwarranted at present. In one notable particular Ramos' specimen differs from the plate and agrees with *C. laevis*. The veins frequently run half the length of the leaf, becoming nearly parallel with the midrib, or even arching somewhat inwards as the leaf becomes narrower. There are suggestions of this on two of the leaves of the plate, but nothing equal to that shown either upon Ramos' specimen or those from Singapore.

8. **Cleistanthus vidalii** nom. nov.

C. blancoi Vidal Revis. Pl. Vasc. Fil. (1886) 234; non Rolfe in Jour. Linn. Soc. Bot. 21 (1884) 315.

C. pallidus F.-Vill. Nov. App. (1883) 187; non Muell.-Arg. in DC. Prodr. 15^2 (1862) 508.

LUZON, Province of Tarlac, Moriones, *Vidal 559* (type); La Paz, *Merrill 2883*, July, 1903.

The latter specimen answers Vidal's description and his type so far as it can be determined from a fragment, and is undoubtedly his species. The capsules are old, and glabrous except sometimes at the base, coming within the limits of the original description "junior pilosa dein glabra." Otherwise the correspondence is even more exact.

The citation of *C. pallidus* as a synonym is entirely in deference to Vidal, in whose herbarium Villar says that he saw it. The writer's strong personal preference would have been to credit it to *C. laevis* Hooker, but there is no reason to suppose that any identification of it can ever be more than conjecture.

9. **Cleistanthus everettii** sp. nov.

Arbor vel arbuscula, floribus ignotis, calyce fructifero sessili, capsulis breviter pedicellatis, dense fulvo-pubescentibus, 3-lobatis, 3-locularibus, 1-spermis; foliis ellipticis vel oblongis, basi rotundatis, apice caudato-acuminatis; petiolis conspicue annulato-rugosis; stipulis lanceolatis, persistentibus.

Flowers unknown: fruiting calyces sessile, axillary, in fascicles of three or less, surrounded by a few bracts; the bracts, both surfaces of the calyx, the outer surface of the disk, the capsule and its pedicel fulvous-pubescent or tomentose; calyx 6 mm long, its 5 lobes lanceolate-ovate, 3.5 mm long, subacute: petals 5, inserted along the upper margin of the calyx-tube, persistent in fruit, 1.1–1.3 mm long, the upper two-thirds broadly triangular, 1 mm wide, acute or subacute at the apex, the margins obscurely crenate, the base truncate, the basal third forming a claw; disk double, the inner free for 1 mm, apparently with a lobe opposite each of the calyx-lobes, the outer forming 4 lobes opposite each of the calyx-lobes and one opposite each of the petals, these lobes 0.3 mm long, lanceolate; capsules with pedicels barely surpassing the calyx-tubes, orbicular-obovoid, 9–10 mm long, 11–13 mm in diameter, 3-lobed, 3-angled, 3-celled, each cell 1-seeded, the capsule at its depressed apex apiculate, still bearing the slender styles, which are cleft from 0.3 mm above their base into 2 arms about 1 mm long, but convolute; seeds poorly developed.

A bush or small tree, its stem 10 cm in diameter, the bark of the ultimate branches gray, striate, the youngest shoots fulvous-pubescent, becoming glabrous; leaves borne on very conspicuously annulate-rugose and somewhat pubescent petioles 5–8 mm long, the lamina elliptic or oblong, 12.5–18 cm long, 3.7–5.5 cm wide, submembranaceous, the margins entire or barely wavy, the base rounded or slightly acute, the apex prolonged into a slender and almost apiculate acumen 2–2.5 cm long; primary lateral veins on each side of the midrib 11–13, not including those of the acumen, veins of all orders plainly evident on both surfaces.

Type collected in dense forest at an elevation of 75 m at Himugaan River, Island of Negros, by H. D. Everett, *For. Bur. 7274*, May 21, 1907.

10. **Cleistanthus ovatus** sp. nov.

Frutex lignosus; capsulis depresso-globosis, siccis brunneis, trilobatis, basi et loborum sinibus interdum parce ferrugineo-villosis, trilocularibus, loculis monospermis; foliis ovatis vel rarissime elliptico-oblongis, basi acutis, apice breviter acuminatis; venis utrinque 10–12, rectis, venis submarginalibus duobus praestantissimis, vel obscure pluribus.

Fruiting specimens alone known: fruiting calyces sessile, in axillary fascicles of 1–4 surrounded by densely ferruginous-villose bracts; calyx glabrous, 3.5 mm long, closely embracing the base of the pedicel of the capsule, divided for 2.5 mm into 5 lanceolate obtuse lobes; petals 5, oblong, 1 mm long, 0.4 mm wide, rounded or denticulate at the apex, basal claw very broad or more often wanting; free portion of disk 0.8 mm long, divided into 5 or possibly sometimes more ovate lobes, which are truncate at the apex, with a few somewhat obscure teeth; pedicel of the capsule 3.5 mm long, capsule depressed-globose, 7–8 mm long, 9 mm wide, yellowish-red, brown when dried, glabrous except sometimes at the base and in the sinuses of the 3 lobes, 3-celled, each cell so far as seen containing a single seed; seeds 4.5 mm long, testa brown, radicle 1.5 mm long, each cotyledon orbicular-ovate, 3.5 mm long, 4.5 mm wide, rounded at the apex, truncate at the base.

A bush 2–3 m high, bark of the ultimate branches gray, glabrous except the brown-tomentose youngest shoots, terete or at the extreme apex strongly angled; leaves borne on petioles 6–10 mm long, the lamina subcoriaceous, entire, ovate or rarely elliptic-oblong, 7.5–14 cm long, 4–6.7 cm wide, at the apex rather gradually contracted into a short blunt acumen, acute at the base; veins on each side of the midrib 10–12, straight, thin, dividing when two-thirds of the way to the margin, two distinct submarginal veins present, with obscure veins outside, veins of all orders, though thin, distinct upon both surfaces, but especially upon the under.

Type collected at Camiguin Island, Babuyanes, by Eugenio Fenix, *Bur. Sci. 4051*, June 27, 1907.

11. **Cleistanthus decipiens** sp. nov.

Floribus masculinis ignotis; floribus femineis subsessilibus, pentameris, petalis triangulari-oblanceolatis, ovario subgloboso, villoso; capsulis pedicellatis, viridibus, sparse villosis; foliis ellipticis vel rarius ovalibus, chartaceis, basi decurrentibus, apice breviter obtuseque acuminatis; venis utrinque 10–12, curvatis.

Male flowers unknown: female flowers subsessile, few in a fascicle, bracted at the base; the bracts few, pubescent; calyx 3.5 mm long, in fruit closely inclosing the base of the pedicel of the capsule, its 5 lobes lanceolate, acute, about 2 mm long; petals 5, triangular-oblanceolate, inserted on the margin of the tube of the calyx, 1 mm long, 0.3 mm wide, cuspidate at the apex, gradually narrowed from the apical fifth to the base; disk thin, inconspicuous, free for about 0.3–0.4 mm, its upper margin forming shallow lobes or nearly truncate; ovary densely villose, 0.8 mm long, 1 mm wide; styles 3, in all 0.8 mm long, bifid for the apical 0.2 mm; capsules borne on villose pedicels 4 mm long, green when fresh, brownish-black when dry, globose-ovoid, triangular in section, 8.5–9 mm long, 9.5–10 mm in diameter, with scattered or dense yellowish-brown villose pubescence, 3-lobed, 3-celled, each cell containing a single seed 6 mm long, 2.5 mm in diameter, shortly 2-lobed at the base, its testa brown; no embryos found.

A shrub 4 m high, the bark of its ultimate branches gray, very slightly striate, glabrous; leaves borne on petioles 4–8 mm long, the lamina entire, elliptic or more rarely oval, 7.2–13.2 cm long, 2.8–5.8 cm wide, decurrent at the base, at the apex shortly and obtusely acuminate, glabrous on both surfaces, paler in color on the under surface; primary lateral veins on each side of the midrib 10–12, curving from the midrib, hardly forming a distinct submarginal vein except in young leaves, the ends of the principal veins usually joined by much more obscure ones only, the venation of all orders nevertheless quite distinct on both surfaces.

Type collected at an elevation of 125 m at Niladlaran, Island of Ticao, by W. W. Clark, *For. Bur. 1001*, May–June, 1904.

Very similar in gross characters to *C. ovatus*, but quite distinct, especially in its venation.

12. **Cleistanthus integer** sp. nov.

Arbor monoicus; floribus pentameris, ovario villoso, integro, 3-loculari, 2-ovulato; capsulis etiam integris, subglabratis; foliis anguste ellipticis vel oblongis, basi brevissime acuminatis, apice acuminatis.

Monoecious; the flowers borne in axillary bracted fascicles: male flowers (only one somewhat damaged specimen seen) borne on pedicels 3.5–4.5 mm long; the calyx 3.5 mm long, divided for two-thirds of its length into 5 broadly lanceolate lobes with thickened apices; petals 5, obovate, 1.2 mm long, 0.8 mm wide, 3-toothed at the apex, narrowed at the base into a short claw; disk covering the base of the calyx; androgynophore about 0.5 mm long; filaments 5, 1.3 mm long, decreasing in diameter upwards; anthers broadly lanceolate, about 1 mm long; rudiment of the ovary lanceolate, 0.7 mm long, 3-notched at the apex: female flowers with apparently a slightly longer calyx divided more deeply into linear-lanceolate lobes, their tips spreading or reflexed in fruit; petals elliptic, nearly 1 mm long, 0.7 mm wide, slightly toothed at the apex; disk divided into 5 oblong lobes 1.5 mm long, and 0.9 mm wide, free for about 1 mm; ovary borne on a short pedicel, globose, fulvous-pubescent, 2.5 mm in diameter; styles 3, deciduous, 0.8 mm long, then forking into 2 arms also about 0.8 mm long: the ovary entire, 3-celled, each cell containing 2 ovules: capsules borne on slender pedicels less than 1 mm long, which are concealed by the calyx, globose-obovoid, 5–5.5 mm long, 5.5–6.5 mm in diameter, reticulate, with a few scattered inconspicuous hairs, dehiscent, 3-celled, the seeds not matured.

A tall tree, the bark of the ultimate branches gray, more or less striate and lenticellate, glabrous; leaves borne on petioles 4–5 mm long, the lamina narrowly elliptic or oblong, or rarely obovate, 7–9 cm long, 2.5–3 cm wide, subcoriaceous, entire, shortly acuminate at the base, at the apex narrowed into a slender acumen 1.5–2 cm long, glabrous and shining on both surfaces; primary lateral veins on each side of the midrib 7–9, arched, the apical becoming subparallel with the midrib, on the upper surface little more conspicuous than the very numerous reticulations, beneath more prominent.

Type collected at Bosoboso, Province of Rizal, Luzon, by Ahern's collector, *For. Bur. 3076*, May 17, 1905.

Very distinct by reason of its entire ovary and capsule, but in all other respects conforming to this genus.

13. **Cleistanthus quadrifidus** sp. nov.

Arbuscula; floribus axillaribus, fasciculatis, pedicellatis, breviter bracteatis, pentameris; ovario sessili, dense villoso, subgloboso, stylis 3, quadrifidis; foliis coriaceis, nitidis, ellipticis oblongis vel ovatis; venis utrinque 8–10.

Flowers yellowish-white, fascicled in the axils of the leaves, subtended by short bracts at the base of the pedicels, which vary in length up to 3.5 mm; calyx 3 mm long, divided for 2 mm into 5 lanceolate-ovate lobes, truncate or acute at the apex; petals oval, 0.6 mm long, 0.5 mm wide, their margins irregularly dentate: male flowers with a disk lining the base of the calyx and free for 0.1–0.2 mm; androgynophore 0.4 mm long, bearing 5 stout filaments 0.7 mm long, the anthers lanceolate, 1.2 mm long, 0.4 mm wide, cordate at the base; rudiment of the ovary 1.5 mm long, lanceolate, comparatively long-rostrate, 3-notched at the apex: female flowers with a disk free for 0.7 mm, cupular, the free margin with numerous shallow teeth; ovary sessile, densely pale-villose, 1.2 mm in diameter; styles 3, in all 0.7 mm long, 2-cleft, the arms also 2-cleft: capsules unknown.

A small tree, glabrous throughout except upon the ovaries and the bracts, the bark of the ultimate branches grayish to yellowish, striate; leaves borne on annular-rugose petioles 3–8 mm long, the lamina entire, coriaceous, shining, brownish-green on both surfaces, elliptic oblong or ovate, 8–13 cm long, 3.5–7 cm wide, acute or very shortly acuminate at the base, at the apex somewhat abruptly contracted into a slender obtuse acumen 1.5–2 cm long, sometimes falcate, but probably as the result of mechanical injury; primary lateral veins on each side of the midrib 8–10, the reticulations very numerous and conspicuous on both surfaces.

Type collected at an elevation of 20 m at Port Banga, District of Zamboanga, Mindanao, by H. N. Whitford and W. I. Hutchinson, *For. Bur. 9478*, in early flower, February 28, 1908.

CYCLOSTEMON Blume.

Cyclostemon grandifolius sp. nov.

Arbuscula; fasciculis paucifloris, floribus mediocriter pedunculatis, sepalis 4, ovalibus, staminibus 15–30; floribus femineis ignotis; foliis oblongis vel ellipticis, rarius lanceolatis, 23–36 cm longis, mediocriter et anguste acuminatis, venis lateralibus utrinque 11–17.

Flowers in axillary fascicles usually of 3 or 4, borne upon shortly and densely tomentose peduncles 2.5–6.5 mm long and 0.4–0.6 mm thick, male alone known: sepals 4, in two rows, green, coriaceous, oval, rounded at the apex, pubescent like the peduncles, 5–5.5 mm long, 4.5–5 mm wide, the outer the thicker; stamens 15–27, the filaments 2 mm long, 0.3–0.4 mm wide, the anthers 1.7 mm long, 0.8–1 mm wide, cordate at the base, rounded at the apex; disk annular, its margins crisped; no trace of an ovary.

A tree 6–8 m. high, with a trunk 7.5–20 cm in diameter, its bark gray, that of the ultimate branches greenish or grayish, striate, along with the petioles short-ferruginous-tomentose or glabrescent; leaves alternate, glabrous, coriaceous, entire or only slightly sinuate, oblong, elliptic, or lanceolate, 23–36 cm long, 6–9 cm wide, borne on petioles 1.2–2.5 cm long and 2.7–3.5 mm wide, at the apex narrowed into an obtuse acumen about 2.5 cm long, not more than 1 cm in width for over that distance from the tip, inequilateral, one side of the base rounded, the other very acute, approaching the midrib before the rounded side, their elevated margins forming with the apex of the petiole a distinct hollow, both surfaces of the lamina shining, the upper bluish-green, the under paler; primary lateral veins on each side of the midrib 11–17, along with the nearly equally conspicuous secondary and tertiary venation reticulate-anastomosing and conspicuous on both surfaces, yellowish or reddish.

Type collected at an elevation of 40 m at Lumbiag, District of Zamboanga, Mindanao, by W. I. Hutchinson, *For. Bur. 6554*, in flower, February 22, 1907. Also collected at Sax River in the same district by R. S. Williams, *no. 2165*, February 14, 1905, and probably further represented by sterile specimens *For. Bur. 6094 Hutchinson*, from Isabela, Basilan. Common name on both islands, *Banaoi*.

A species in habit resembling *C. bordenii* Merr., but distinguished by the smaller flowers borne upon longer and more slender peduncles. The leaves have a greater number of primary veins than in typical *C. bordenii*.

Cyclostemon littoralis sp. nov.

C. Cumingii Merr. Philip. Jour. Sci. 1 (1906) Suppl. 76; non Baill. Étud. Gén. Euph. (1858) 562.

Arbuscula: floribus dioicis, axillaribus, fasciculatis, longe pedunculatis; sepalis 4; corolla nullo: masculinis 10-stamineis, disco 10-lobato, ovario nullo: femineis sine corolla vel staminibus; disco annulari undulato; ovario subgloboso, biloculari, 2- vel 1-ovulato; stigmate sessili discum planum succulentum varie lobatum efformante: foliis ovalibus ellipticis vel ovatis, basi plus minusve inaequilateralibus, apice acuminatis.

Flowers in axillary fascicles of 7–24, on finely pubescent peduncles 13–18 mm long and 0.2 mm thick, arising from an involucre of numerous lanceolate pubescent scales 2.5–3 mm long: male flowers with 4 broadly ovate sepals, 3.5 mm long, 2.7 mm wide, truncate or rounded at the apex, reflexed at anthesis, more or less pubescent; stamens 10, each inserted outside a division of the imbricate 10-lobed disk, the filaments 2.5 mm long, glabrous, anthers ovate, pubescent, 1.2 mm long: female flowers usually with much shorter peduncles than the male; calyx the same as in the male; stamens wanting; disk annular, undulate on the margins; ovary sessile, subglobose, somewhat rhombic in section, about 2 mm in diameter, 2-celled, each cell containing 2 or by abortion 1 ovule; stigma sessile, forming a succulent flattened disk somewhat variously lobed but most often broadly I-shaped.

A small tree attaining 9 m in height with a trunk 25 cm in diameter, the ultimate branches yellowish, striate, lenticellate, older branches grayish; leaves alternate, entire or barely sinuate, coriaceous, glabrous, borne on petioles 4–8 mm long and 1.5–2 mm in diameter, elliptic, oval, or ovate, 6.7–13 cm long, 3.7–6 cm wide, narrowed at the apex into a short and rounded acumen, at the base acute or rounded, inequilateral or almost equilateral, blue- or light-green; primary lateral veins 7 or 8 pairs, along with the almost equally prominent secondary and tertiary venation reticulate-anastomosing, conspicuous but with the exception of the yellowish midrib beneath not or only slightly raised above the lamina.

Type collected along the coast at Lamao River, Mount Mariveles, Luzon, by R. S. Williams, *no. 377*, in flower (male), December 30, 1903. Also represented by *Whitford 1269* (male) and *Whitford 1275* (female), May 11, 1905, from the same locality.

Originally identified both by the writer and Mr. Merrill as *C. Cumingii* Muell.-Arg., but shown by the latter's comparison of it with type material at Kew to be distinguishable by its broader, entire leaves not pointed at the apex. *C. Cumingii* still awaits rediscovery.

GLOCHIDION Forst.

Glochidion williamsii sp. nov.

Frutex vel arbuscula, monoica; floribus fasciculatis, pedicellatis, parvis: sepalis et petalis 3 vel 4, apice rotundatis; disco nullo; staminibus 3 vel 4; fructu capsulari, 5- vel 6-loculari, seminibus 2, collateralibus, rubris: foliis ellipticis, ovalibus, vel oblongis, integris, subcoriaceis, basi acutis, apice breviter acuminatis.

Flowers in axillary fascicles of 10–15, borne on glabrous pedicels 1.7–4.5 mm long, those of both sexes sometimes at least in the same fascicle: male flowers with 3 or more rarely 4 sepals, in bud imbricate, ovate, 2.4–2.5 mm long, 2–2.2 mm wide, usually broadly rounded at the apex, pale on the margins, glabrous; petals 3 or 4, fleshy, strongly concave, oblong, 2 mm long, 1.5 mm wide, rounded at the apex; disk wanting; stamens 3 or 4, sessile and forming a subglobose mass in the middle, anthers oblong, 0.8 mm long, 0.6 mm wide, the connective half the width of the anther, and prolonged 0.1–0.2 mm beyond the apex of the anther; pistil entirely wanting: female flowers with the length of their perianth only about two-thirds that of the males, but proportionally broader; stamens and disk wanting; ovary sessile or subsessile, depressed-globose, 1 mm long, 2 mm in diameter, at the apex 6-grooved, in the flowers seen apparently without cells: capsules greenish, 1 cm long, 1.3–1.5 cm in diameter, 5- or more frequently 6-lobed, the lobes usually 2-lobed, 5- or 6-celled, each cell with two red collateral seeds 3.5 mm long.

A glabrous tree or shrub 4–7.5 m high, with stems attaining 17.5 cm in diameter, wood reddish, bark of medium-sized branches grayish, striate and scaly, that of the younger branches striate and lenticellate; leaves alternate, borne on petioles 2–6 mm long, the lamina yellowish-green or bluish-green, subcoriaceous, entire, oblong, elliptic or oval, 5–9 cm long, 2–4.2 cm wide, shortly and usually acutely acuminate at the apex, at the base inequilateral and obliquely contracted into the shortly margined petiole; pairs of lateral veins 7–11.

Type collected at Baguio, Province of Benguet, Luzon, by R. S. Williams, *no. 953*, in flower and fruit, September 16, 1904. Also represented by *For. Bur. 4927 Curran*, Baguio, *Merrill 4804*, Pauai to Baguio, and *Williams 1356*, Mount Santo Tomas, all in Benguet, and probably by an unnumbered sheet collected by *H. N. Whitford* at Lamao River, Province of Bataan. The last has staminate and immature pistillate flowers only, and the ovaries seem longer than wide.

This species is closely allied to *G. subfalcatum* Elmer, but apparently must be separated on account of the different shape of the capsules. Typical forms of the two species are quite distinct vegetatively, but other forms run rather closely together.

PHYLLANTHUS Linn.

Phyllanthus acuminatissimus sp. nov.

Arbor glabra; floribus in fasciculis basi bracteatis dispositis; masculinis perianthio 5-lobato, staminibus 5, disco 5-partito, quaque parte bilobata intra stamina inserta, ovario rudimentario; capsulis disco subintegro basi circumdatis, trilobatis, trilocularibus, seminibus 2; foliis ellipticis, basi acutis, apice acuminatissimis, subtus glaucis.

Flowers borne in axillary fascicles upon slender peduncles arising from small bracts: the male flowers with peduncles 2.5–4 mm long; calyx with 5 lobes, free nearly to the base, imbricate, orbicular, ovate, or obovate, broadly rounded at the apex, the base very slightly thickened; stamens 5, their filaments strongly grooved, 1.7 mm long, the anthers dorsifixed, 2-celled, dehiscing longitudinally, nearly orbicular, 0.8 mm in diameter, cordate at the base; disk fleshy, separated by the stamens into 5 2-lobed portions 0.7 mm long; rudiment of the ovary very small, prolonged into 2 style-like arms, lanceolate in outline and blunt at the apex: capsules on peduncles 6–7 mm long; calyx as in the male flowers; disk annular, shallow, fleshy, 1 mm in diameter; capsules globose, 3–3.5 mm in diameter, slightly 3-lobed, 3-celled, each cell containing 2 seeds, one usually better developed than the other, in shape similar to the segments of a sphere, the larger 2 mm long, with a radius of 1 mm; stigmas 3, each 2-lobed and sometimes with a tendency to further division, all uniting centrally, lying nearly flat upon the capsule, somewhat star-like, the arms either radiating equally or more to one side.

A tree attaining a height of 10.5 m, with a trunk 22.5 cm in diameter, the bark of the ultimate branches grayish or brownish, striate; leaves alternate, borne on petioles 4–7 mm long, the lamina submembranaceous, entire or slightly wavy upon the margins, elliptic or oblong, 10–16 cm long, 4–6 cm wide, acute at the base, at the apex contracted into an acumen about 2 cm long, often apiculate, dull green on the upper surface, glaucous on the under surface, with 5–7 primary lateral veins on each side of the midrib; stipules lanceolate, 4 mm long, caducous.

Type collected at Santa Cruz, District of Davao, Mindanao, by R. S. Williams, *no. 2807*, in flower, May 16, 1905; also represented by *Williams 2706* from the same locality, in fruit, April 16, 1905; also by *Bur. Sci. 1739 McGregor*, Toledo, Cebu, October, 1906.

AQUIFOLIACEÆ.

ILEX Linn.

Ilex formosana Maxim. in Mém. Acad. Pétersb. VII **29^3** (1881) 46.

I. rolfei Elmer Leafl. Philip. Bot. 1 (1908) 314.

LUZON, Province of Benguet, Baguio, *Williams 922, 1999*, June–December, 1904; *Elmer 8764, 8792*. March, 1907: Province of Zambales, Mount Tapulao, *Bur. Sci. 5095 Ramos*, December 13, 1907; *For. Bur. 8092 Curran*, December 14, 1907.

Hitherto known only from Formosa.

RHAMNACEÆ.

RHAMNUS Tourn.

Rhamnus formosana Matsum. in Bot. Mag. Tokyo **12** (1898) 22.

LUZON, Province of Benguet, *Williams 1121*, *Elmer 6379*, *For. Bur. 4873 Curran*, *Loher 331, 330*, *Vidal 2012* (the last two *fide* E. D. Merrill); Province of Tayabas, Mount Banajao, *Whitford*, without number.

This genus has not hitherto been reported from the Philippines. Fragments from *Williams 1121* were sent for comparison with the type to Dr. B. Hayata of the Imperial Botanical Gardens, Tokyo, and he finds that while the Philippine plant has rather larger flowers, with slightly prominent ridges on the wall of the ovary, and leaves not exactly identical in outline with the Formosan material, the differences are not of sufficient importance to justify specific segregation.

ZIZYPHUS Linn.

Zizyphus crebrivenosa sp. nov.

Scandens; floribus terminalibus axillaribusve, composito-cymosis, pentameris, ovario biloculari 1- vel 2-ovulato; foliis alternis, breviter pedicellatis, ellipticis, basi cordatis, apice acuminatis mucronastique, obscure denticulatis, valde trinerviis, nervis transversis multis, conspicuis.

Flowers axillary and terminal, forming compound cymes 1.5–2.5 cm long, the peduncles and pedicels brown-tomentose, the calyx yellowish-tomentose, pedicels 2 mm long: calyx 3.5 mm long, divided for about half its length into 5 lobes, which are broadly ovate, rounded at the apex, hooded, and 2-nerved within; petals 5, inserted on the margin of the calyx-tube, cucullate, composed of a slender claw nearly 1 mm long and an obovate body of somewhat greater length and 0.6 mm wide, with advancing maturity bent down over the outside of the calyx between its lobes; stamens 5, opposite the petals and immediately within them, the filaments subulate, 1.4 mm long, the anthers 0.5 mm long, ovate, basifixed; disk filling the tube of the calyx; ovary 1.8 mm in diameter, immersed in the disk, tomentose, 2-celled, each cell containing one or two ovules; styles 2, 1.2 mm long, united for about two-thirds of their length, diverging at the apex; ovules plano-convex, 0.4 mm long.

A woody vine, trailing over trees, with stems 3.7 cm in diameter; bark of the ultimate branches purplish, striate, ferruginous-pubescent, armed at the nodes with one or rarely a pair of spines, which are brown, retrorse or recurved, 3.5 mm long: leaves alternate, borne on petioles 3–4.5 mm long, the lamina brownish-green on both sides, deeper above, elliptic, inequilateral and somewhat cordate at the base, obtusely acuminate and mucronate at the apex, denticulate throughout their whole length but not conspicuously, 7.8–10.3 cm long, 3–4.4 cm wide, conspicuously 3-nerved, nerves immersed in the upper surface, prominent and brown in color beneath, primary nerves between the midrib and the lateral nerves 30–40 on each side, between the lateral nerves and the margins about ten less, arched-anastomosing, forming a submarginal vein, all venation conspicuous, nerves beneath lightly pubescent.

Type collected at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2335*, in flower, February 21, 1905.

TILIACEÆ.

DIPLODISCUS Turcz.

Diplodiscus paniculatus Turcz. Bull. Soc. Imp. Nat. Moscou 31^1 (1858) 235.

This species is endemic in the Philippines, and as now represented in the herbarium of the Bureau of Science is decidedly polymorphic. There seem to be three more or less distinct types, but with characters not sufficiently constant to justify specific segregation, although the two extremes are apparently very easily distinguished.

The typical specimens, including both of the Cuming collections on which the species was originally based, have a very lax inflorescence, with comparatively long and slender pedicels, the petals seem always to number 5, and at the base are narrowed into a distinct claw.

The other extreme type has both calyx-lobes and petals almost always 4, the inflorescence is more condensed, the pedicels are shorter and stouter, the petals are usually broader and at their base either do not form a definite claw, or the claw is very short. These are known only from Mindanao.

Uniting these, however, is a third set, from Mindanao and Basilan, with the petals usually 4, but on an occasional sheet with about one-third of the flowers in 5's, the pedicels are intermediate in length between those of the other two groups, and are nearer the type in thickness, the inflorescence is usually lax, the bases of the petals rather conform to the second type.

The plants, in spite of very considerable individual variations, can not be distinguished by any vegetative characters.

The collections which seem to conform to the first type are *Cuming 1686, 1726* (type), without definite locality, but supposed to be from the Island of Samar: Luzon, Province of Ilocos Sur, San Quintin, *For. Bur. 5646 Klemme* (fruiting; probably): Province of Laguna, Los Baños, *Elmer 8294:* Province of Tayabas (Infanta), Anoling, *For. Bur. 6692 Kobbe;* between Casiban and Gumaca, *For. Bur. 10262 Curran;* Lucban, *Elmer 9195,* Atimonan, *For. Bur. 6703 Kobbe:* Province of Camarines, Mount Isarog, *For. Bur. 10503 Curran;* Pasacao, *Ahern 18:* Ticao, *For. Bur. 1087 Clark:* and presumably the following sterile specimens from Tayabas Province; between Paete, Laguna, and Piapi, *For. Bur. 10135 Curran;* Malicboi, *Ritchie;* between Dagutan and Pitogo, *For. Bur. 10218 Curran.*

To the second type belong the following, all from Mindanao: District of Zamboanga, Sax River, *Williams 2196;* Lake Lanao, Camp Keithley, three sheets, *Mrs. Clemens,* without number; Province of Misamis, Mount Malindang, *For. Bur. 4692 Mearns & Hutchinson.*

The linking type includes the following; Mindanao, District of Cotabato, Balugu, *For. Bur. 6559 Hutchinson;* Lake Lanao, Camp Keithley, *Mrs. Clemens 616* and 4 unnumbered sheets; District of Zamboanga, Tetuan, *Ahern 376:* Basilan, Isabela, *For. Bur. 3958 Hutchinson, DeVore & Hoover 97;* with only insular locality, *Hallier.*

Two sheets, *Whitford 1684,* Aroroy, Masbate, and *For. Bur. 7403 Danao,* Occidental Negros, are unfortunately sterile.

The stamens in this species are always described as free. They also vary in this respect. In the extreme development there is a short but perfectly definite androgynophore at the summit of which arise the stamens followed by the staminodes with a very short-stalked ovary; but the ovarian stalk may be entirely wanting; more commonly the bases of the filaments form a tube 2.5 mm or more in length, sometimes they are entirely free to the base. I have failed to correlate these variations with the types noted above; they more probably indicate age.

This staminal arrangement is very similar to that of *Grewia stylocarpa* Warb., an even commoner Philippine plant, ranging from Benguet in northern Luzon to Davao in southern Mindanao. The latter is, however, a true *Grewia,* having capitate cymes paniculately arranged, each head surrounded by sepaloid bracts and containing 3 or 4 flowers. The sepals are separate to the base, much exceeding the petals, the anthers are not confluent, and mature flowers show a short but definite gynophore, which is not evident in very young flowers.

It is not contended that *Diplodiscus* should be united with *Grewia,* as the sepals in the former never split to the base, and the anthers are confluent, even in buds.

Pierre[3] has reduced *Diplodiscus* to *Brownlowia,* but if the separating characters cited in the Pflanzenfamilien hold good for the latter, it seems preferable to hold them apart.

TRIUMFETTA Plum.

Triumfetta suffruticosa Blume Bijdr. (1825) 113.

Collected at an elevation of 900 m at Todaya, District of Davao, Mindanao, by R. S. Williams, *no. 2591,* in flower and fruit, April, 1905.

Hitherto known only from Java.

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[3] Fl. For. Cochinchine sub. *pl. 130.*

STERCULIACEÆ.

PTEROSPERMUM Schreb.

Pterospermum subpeltatum Merrill sp. nov.

Arbor: floribus axillaribus vel terminalibus, plerumque solitariis, pentameris; sepalis longis, ensiformibus, prope ad basim connatis; petalis sepalis brevioribus; fructu capsulari, ligneo, 5-valvato, seminibus alatis: foliis alternis, oblongo-ovatis, peltatis vel subpeltatis.

Flowers axillary or terminal, usually solitary, borne on pedicels 1.7–2 cm long; bracts similar to stipules, 1 cm long, forking into 2 linear lobes 2 mm above their base, the united portion rounded, deciduous: sepals 5, 4–6.2 cm long, distinct to about 4 mm from the base, 3.5 mm wide, ensiform, acute at the apex, brownish-tomentose without and gray-tomentose within, coriaceous; petals 5, membranaceous, 2.8 cm long, 9 mm wide, semi-obovate, one margin straight or slightly concave, the other strongly convex, traversed longitudinally by about 20 veins, occasionally forking or anastomosing; androgynophore 5.5 mm long, the staminodes rising 2 cm and the stamens 1.6 cm from its apex, the filaments 11 mm long, the anthers hardly wider than the filaments, 5 mm long; pistil beyond the gynophore 2.2 cm long, the ovary 7 mm long and 6 mm in diameter, 5-celled with numerous ovules in each cell: fruit a woody loculicidal capsule, 5–7 cm long, brown-tomentose, slightly acuminate at the base, acute at the apex, 5-angled, probably ellipsoid before dehiscence, 5-valved; seeds numerous, 7 mm long, 6 mm wide, prolonged into a membranaceous wing 2 cm long and 8 mm wide.

A tree 15 m high, the trunk 35 cm in diameter with rough somewhat scaly purplish bark, that of the ultimate branches purplish, densely grayish- and ferruginous-stellate-tomentose; leaves alternate, borne on petioles 5–6 mm long and 1.7–2 mm in diameter, the lamina oblong to ovate, mostly 13–18 cm long, including an acumen 1–3 cm long, which is acute or nearly so and often subfalcate, 4.5–8 cm wide, the base usually rounded, with the petiole attached 2–8 mm within the margin, less often shallowly cordate, inequilateral, the margins entire or more or less sinuate, the upper surface glabrous or on the youngest leaves densely ferruginous-stellate-tomentose, the under surface densely white-tomentose with very numerous short ferruginous or nearly orange stellate hairs scattered over the entire surface; nerves at the insertion of the petiole 4–8, and 5–7 additional pairs of lateral veins; stipules 7–12 mm long, linear but attached by a broadened base, deciduous.

Type collected at an altitude of 210 m at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2350*, in flower, February 18, 1905. Also

represented by *Mrs. Clemens 522*, and by several unnumbered sheets, Camp Keithley, Lake Lanao, Mindanao, April–July, 1906, showing all stages of flower and fruit; also by sterile material collected by *Hallier* on the Island of Basilan, January, 1904.

DILLENIACEÆ.

SAURAUIA Willd.

Saurauia denticulata sp. nov.

Floribus fasciculatis, caulinis, pentameris; staminibus 20, biseriatis; stylo valde sed inaequaliter trifido, ovario triloculari; foliis breviter petiolatis, obovatis vel oblongo-ellipticis, brevissime acuminatis, basi subcordatis, margine crebrissime spinoso-denticulatis.

Flowers in fascicles 2–3 cm in diameter, containing 50 flowers or more, borne on branching tubercles upon the lower parts of the stem; pedicels 5–11 mm long, rather densely covered with ferruginous acicular scales 0.5 mm long: sepals 5, united at the extreme base, the 3 outer ovate, 6 mm long, 3–3.5 mm wide, rounded or subacute at the apex, with a few or several conspicuous dark stiff hairs on the outer surface, the 2 inner sepals lanceolate, 5 mm long, 2 mm wide; petals 5, pinkish, united at the base, elliptic, 5.5 mm long, 3.5 mm wide, obscurely notched at the apex; stamens 20, in two rows, the filaments 1 mm and 0.5 mm long, respectively, the anthers 1.8–2 mm long, 0.4 mm wide throughout their length, cordate at the base, 2-celled; ovary ovate in outline, about 2 mm long, 3-celled with several ovules in each cell, but apparently few of them developing, style 3.5–4.5 mm long, deeply but unequally trifid, stigma minute.

A shrub with stems 2.5 m high and 2.5 cm in diameter, the bark yellowish or near the apex grayish-yellow, glabrous except the apex and the petioles which are covered with appressed acicular scales attaining a length of 3 mm but usually much shorter: leaves borne on petioles 3.5–9 mm long, and 2–2.5 mm in diameter, subpeltate, the lamina obovate elliptic or oblong, 11–20 cm long, 4–8 cm wide, at the base truncate or on the upper surface subcordate, uninjured apices shortly and acutely acuminate, the margins with very numerous spinose denticulations, olivaceous on the upper surface, yellowish-green on the under surface, the midrib and primary lateral veins of the under surface and the basal half or less of the midrib of the upper surface with appressed acicular scales; primary lateral veins on each side of the midrib 16 or 17, somewhat impressed on the upper surface, together with the secondary veins distinct on the under surface.

Type collected at an elevation of 240 m at Sax River, District of Davao, Mindanao, by R. S. Williams, *no. 2167*, February 14, 1905.

THEACEÆ.

ADINANDRA Jack.

Adinandra elliptica sp. nov.

Arbor parva; floribus solitariis, longe pedicellatis, albidis, pentameris; sepalis exterioribus pubescentibus, omnibus margine glanduloso-denticulatis; foliis ellipticis, sericeo-tomentosis vel glabrescentibus.

Flowers solitary, axillary, at anthesis 9–11 mm in diameter, borne on pedicels 3.2–3.5 cm long: sepals 5, imbricate, 6.5–7 mm long, 4.5–5.5 mm wide at base, broadly ovate, rounded and conspicuously mucronate at the apex, glabrous within, the two outer silky-pubescent on the outer surface, the three inner with scattered hairs along the middle, all glandular-denticulate on the margins; petals 5, whitish, oval, 5–6 mm long, 4 mm wide in the middle, silky-villose on the other upper half, elsewhere glabrous; stamens 25–30, inserted on the base of the corolla, the filaments 0.6–0.8 mm long, the anthers 1.8–2 mm long, densely pubescent, especially on the margins but not on the connective; pistil at anthesis 11 mm long, ovary pubescent, 4-celled, many-ovuled, 3.5 mm in diameter; ovules 0.2 mm long, obliquely obovate to circular in outline, testa yellowish-brown; style undivided, 2.5 mm long, lanceolate, elongating in fruit, and then sometimes swollen in the second fourth of its length from the base, glabrous or nearly so; fruit, perhaps not quite mature, globose, 7.5 mm in diameter, 4-celled, the style 1 cm long; seeds 1.5–1.8 mm long, reniform, the testa black, hardly lucid, with 6–8 rows of tubercles visible on side view.

A small tree reaching 9 m in height, its trunk 17.5 cm in diameter; bark of the ultimate branches light-brown to purplish-black, lightly striate, silky-ferruginous-tomentose or glabrescent; leaves alternate, the lamina elliptic, rarely oblong or oval, the youngest excepted 6–10.5 cm long, 2.3–3.65 cm wide, narrowed at the base, usually abruptly, into a silky-tomentose or glabrescent petiole 2.5–6 mm long, prolonged at the apex into an acute or obtuse acumen 3–13 mm long, the margins obscurely glandular-serrate, at least in dried specimens often revolute, glabrous on the upper surface except sometimes at the very base, the under surface of young leaves villose, especially on the midrib and margins, that of older leaves glabrous or nearly so; veins slightly impressed on the upper surface, and projecting from the under surface; primary lateral veins on each side of the midrib 12–15, arched-anastomosing, forming two marginal veins, one very near to the margin, the other more remote, about 11–16 mm from the margin; venation of all orders almost equally conspicuous.

Type collected at Sablan, Province of Benguet, Luzon, by R. S. Williams, *no. 1369*, in flower and fruit, November 18, 1904; also represented by *Williams 1115*, Baguio, Province of Benguet, in late flower, June 29, 1904.

MELASTOMATACEÆ.

DISSOCHAETA Blume.

Dissochaeta celebica Blume Mus. Bot. Ludg.-Bat. 1 (1849) 36.

Collected at an elevation of 900 m at Todaya, District of Davao, Mindanao, by R. S. Williams, *no. 2571*, in flower and fruit, April 4, 1905. Native (Bogobo) name, *Bogin*.

The specimen agrees almost perfectly with the descriptions of Blume and of King in his Materials for a Flora of the Malay Peninsula, the slight divergences being in the direction of *D. intermedia* Bl.

Now first reported from the Philippines, but of wide Malayan distribution, being known from Celebes, Borneo, Bangka, and the Malay Peninsula.

MEDINILLA Gaudich.

Medinilla apoensis sp. nov.

Frutex; floribus paniculatis, terminalibus vel subterminalibus, pentameris; bracteolis magnis, caducis, pedicellis articulatis, calyce subtruncato; foliis ellipticis vel oblongis, 7-nerviis, breviter petiolatis, basi acutis, apice breviter acuminatis, coriaceis; nodis setosis.

Flowers in terminal or subterminal panicles 6–9 cm long, the ultimate flowering pedicels 3.5–4.5 mm long, elongating in fruit, having at their bases caducous membranaceous oblanceolate bracteoles 12 mm long, conspicuously articulated with the flowers: calyx with a pseudostalk 1.5 mm long, this also subsequently elongating, in all 6–7 mm long, broadly cup-shaped, projecting 1.5 mm beyond the ovary, its margin subtruncate, the 5 obscure lobes very shallow and rounded; petals probably 5, elliptic, 11 mm long, 4.5 mm wide, their apices very shortly and obtusely acuminate, the margins involute; stamens 10, the filaments 3 mm long, the anthers 2 mm long, the base of the connective with a spur 0.8 mm long and on each side a minute lobe; ovary 5-celled with numerous ovules, the style 7 mm long, gradually narrowed upwards, the stigma capitate, minute, but exceeding in width the apex of the style: fruit subglobose, 7 mm in diameter, rimmed at the top by the persistent calyx, attached by a pseudostalk now attaining a length of 7 mm and a pedicel attaining 9 mm, 5-celled, with numerous seeds; seeds concavo-convex in outline, 0.7 mm long, 0.5 mm wide, the testa white.

A spreading bush 3 m high, setose at the nodes, but otherwise glabrous, the bark of the ultimate branches gray, terete, slightly striate and lenticellate; leaves borne on petioles 5–8 mm long, the lamina coriaceous, bluish-green on the upper surface, elliptic or oblong, 10–20 cm long, 4.4–9.5 cm wide, acute and slightly decurrent at the base, shortly acuminate at the apex, 7-nerved, the outer nerve of each side less conspicuous than the others; primary lateral veins on each side of the

midrib about 20, evident on the upper surface, but not on the under surface.

Type collected at an elevation of 1,950 m on Mount Apo, District of Davao, Mindanao, by R. S. Williams, *no. 2569,* in flower and fruit, April, 1905. From it, it is impossible to separate *DeVore & Hoover 309,* from the same locality, May, 1903, although the leaves are smaller than in the type, furnishing the minimum measurements given above.

Medinilla pachygona sp. nov.

Arbuscula ramosa; floribus ternis breviter pedicellatis pedunculorum tenerorum apice fasciculatis, pentameris; calyce cupuliformi truncato, supra ovarium protracto; foliis petiolatis, ellipticis, ovalibus, vel ovatis, basi acutis, apicee breviter obtuseque acuminatis.

Flowers fascicled in threes, borne on pedicels 3–5.5 m long, which are minutely bracteolate at the base, radiating from the apex of very slender peduncles 3–4 cm long, arising singly or in pairs in or beneath the axils of the lateral leaves: single flowers 1.6 cm long; calyx cup-shaped, 5.5–8 mm long, 5.5–8 mm wide, strictly truncate except for 5 minute, inconspicuous teeth, glabrous without, densely tomentose within, prolonged 2.5 mm beyond the ovary and very loosely inclosing the flower; petals 5, pale pink, strongly imbricate, twisted to the right, broadly elliptic, 11–12 mm long, 6 mm wide, rounded at the apex, densely short-tomentose on both surfaces except on the margins, veined along the middle; stamens 10, subequal, the filaments 4.5 mm long, gradually thickened upwards, anthers linear, blunt at the apex, connective at the base forming two lateral lobes and a short spur, each about 0.8 mm long; ovary with very thick outer walls, the lumen forming only about one-third of the whole diameter, 5-celled; style nearly 1 cm long, glabrous, slightly thickened upwards; stigma capitate, narrower than the style.

A slender bush 3.5 m high, with numerous slender branches, its ultimate branches covered with gray bark, striate, subangulate; leaves opposite, borne on petioles 4.5–8.5 mm long, the lamina elliptic, oblong, or ovate, 4.5–7 cm long, 2.2–3.7 cm (mostly 2.5) wide, acute at the base, shortly and bluntly acuminate at the apex, 5-nerved, bluish-green and glabrous on the upper surface, minutely brown-lepidote-tomentose on the under, entire, moderately coriaceous.

Type collected at Baguio, Province of Benguet, Luzon, by R. S. Williams, *no. 952,* in flower and young fruit, September 20, 1904.

Medinilla williamsii sp. nov.

Frutex parvus; floribus cymosis, longe pedunculatis, in caulis parte inferiori plus minusve fasciculatis, pentameris, calyce late sed breviter 5-lobatis, petalis albidis; foliis mediocriter petiolatis, oblongis vel ellipticis, papyraceis, apice brevissime acuminatis, base subacutis; venis utrinque 5, pinnatim dispositis.

Flowers cauline, borne on tubercles situated usually on the lower part of the stem, cymose, one densely pubescent peduncle 1–3.5 cm long or sometimes more arising from each tubercle, the ultimate pedicels 1–3 mm long; calyx campanulate, in all 5–6.5 mm long, 3.5 mm wide, scurfy-pubescent, projecting 2 mm beyond the ovary, the upper margin shallowly divided into 5 broadly rounded acuminate lobes; petals 5, whitish, oblanceolate, more or less oblique and 3-toothed at the apex, 6–6.5 mm long, 2.5 mm wide, contracted to 1 mm shortly above the base; stamens 10, subequal, the filaments 2.5–3 mm long, of equal diameter throughout, the anthers also 2.5–3 mm long, tapering to the apex, basal lobes of the connective 0.4 mm long, spur 0.2 mm long; ovary 5-celled, with fairly numerous ovules.

A small shrub about 2 m high, with a stem about 2.5 cm in diameter, its bark pale-gray, striate, lenticellate, that of the younger branches yellowish-scurfy-tomentose; leaves opposite, on petioles pubescent like the stem and 1.5–2.7 cm long, the lamina elliptic or oblong, 13–21 cm long, 5.6–9.3 cm wide, very shortly acuminate and apiculate at the apex, at the base acute, but sometimes truncate just at the insertion of the petiole, papyraceous, obscurely crenulate on the margins, bluish and glabrous on the upper surface, beneath olivaceous and densely stellate-pubescent with the midrib and veins tomentose; venation pinnate, with 5 pairs of lateral veins.

Type collected at an elevation of 150 m at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2412*, in flower, February 20, 1905.

ONAGRACEÆ.

EPILOBIUM Dill.

Epilobium philippinense sp. nov.

Sublignosum; caulibus simplicibus vel parce ramosis; floribus paucis, racemosis, terminalibus, tetrameris, mediocris; petalis integris vel breviter bilobatis; stigmate late elliptico, juniore late clavato, obscure lobato; foliis oppositis vel superioribus alternis, ovatis vel lanceolatis, breviter pedicellatis, glanduloso-serratis.

Inflorescence few-flowered, terminating the stem or the short lateral branches, racemose; the flowers regular, leafy-bracted, at anthesis the ovary 1.8–3.3 cm long, borne on a peduncle 1.5–2.5 mm long, and expanded at the apex into a disk about 2 mm in diameter, minutely pubescent throughout; calyx-lobes 4, lanceolate, 5–6 mm long, 1.5 mm wide, obtusely acuminate at the apex, the midvein fairly prominent, with scattered villose pubescence on the back and margins; petals 4, pink to purplish, 7.5 mm long, 4 mm wide, contracted into a somewhat slender claw at the base, and entire or obcordate at the apex; stamens 8, the anthers oval, 1 mm long, 0.8 mm wide, the filaments alternately longer and shorter, the longer ones 1.5–2 mm long, the intervening ones about half this length; style 4 mm long, 0.4 mm wide, the stigma when young broadly clavate, when mature attaining a length of 2.7 mm and a width of 1.6 mm, obscurely 2-lobed at the apex, each lobe showing still more obscure traces of further division; capsule borne on a stalk now 4.8 mm long, its own length 5.5–6.6 cm, before dehiscence 1–1.3 mm in diameter, with numerous seeds; seeds dark-brown, minutely papillose, in outline oblanceolate or nearly ellipsoid, 1.2 mm long, 0.4 mm wide, distinctly narrowed at both ends but abruptly at the apex; coma white, 8–10 mm long.

Stems greenish to purplish, slightly woody, simple or near the apex slightly branching, 15–50 cm high, near the base 1–2.5 mm in diameter, terete or near the apex slightly angled, uniformly pubescent with short whitish appressed or slightly spreading hairs; leaves opposite or near the apex often alternate, the lamina glabrescent on the upper surface, minutely pubescent beneath, ovate to lanceolate, near the middle of the stem 1.4–2.8 cm long and 8–11 mm wide, slightly decreasing in size near the base of the stem, and very distinctly near its apex, passing into bracts, glandular-serrate on the margins and usually glandular-tipped at the apex, rounded near the base but becoming slightly decurrent upon the petioles, which are 0.5–1.5 mm long, those of opposite leaves usually connate and somewhat decurrent; lateral veins on each side of the midrib 4 or 5.

Type collected on dry grassy slopes in pine forest on Mount Data, District of Lepanto, Luzon, by E. D. Merrill, *no. 4484*, in flower and fruit, November 3, 1905. Further represented by the following collections from Lepanto and Benguet: *Merrill 4561*, Mount Data, flowers and fruit, November 4, 1905; Pauai, *Bur. Sci. 4353 Mearns*, flowers, July, 1907; Bugias, *Merrill 4665*, flowers and fruit, October, 1905; Baguio to Ambuklao, *Merrill 4379*, flowers and fruit, October 24, 1905; Mount Santo Tomas (Tonglon), *Williams 1541*, fruit, November 29, 1904.

This genus has not hitherto been reported from the Philippines except by the generic name.

Epilobium platystigmatosum sp. nov.

Praecedenti affine: floribus racemosis, caulis dimidiam superiorem partem occupantibus, regularibus, tetrameris; petalis plus minus alte bilobatis, stigmate orbiculari-ovali; foliis linearibus vel sublinearibus, denticulatis serratis vel sinuosis, basi gradatim in petiolum anguste marginatum contractis.

Flowers regular, forming a terminal raceme extending about half the length of the plant; at anthesis the ovary 1–2 cm long, borne on a peduncle about 6 mm long; calyx-lobes 4, elliptic-lanceolate, 2.6–4 mm long, 1–1.7 mm wide, at the apex shortly acuminate with involute margins; petals 4, pink, 3.3–4.5 mm long, 2 mm wide, at the apex divided more or less deeply, even to beyond the middle into 2 rounded lobes several-veined; stamens 8, the anthers broadly oval, 0.4 mm long, the filaments alternately longer and shorter, about 1.5 mm, and half this length, respectively; style 1.5 mm long, stigma orbicular-obovate, 1.4–1.5 mm long, 1.3–1.5 mm wide, obscurely 2-lobed; capsule 4.2–5.4 cm long, its stalk 9–14 mm long, with numerous light-brown ellipsoidal minutely punctate seeds 0.8 mm long and 0.3 mm wide; coma whitish, 7–8 mm long; peduncles, ovary, and the outer side of the calyx-lobes slightly and minutely pubescent.

Stems somewhat woody, reddish, terete, branched, 40–50 cm high, 4–5 mm in diameter near the base, minutely and obscurely striate, uniformly pubescent with short appressed whitish hairs; leaves opposite or near the apex alternate, the lamina linear or very narrowly lanceolate or elliptical, 8–22 mm long, 1–5 mm (mostly 2 mm) wide, the margins distantly serrate, denticulate, or merely sinuate, rounded or toothed at the apex, at the base gradually narrowed into a slender margined petiole 1.5–6 mm long, venation obscure except the midrib, but when perceptible usually 2 veins on each side of the midrib; both surfaces of the leaf slightly pubescent or glabrescent.

Type collected on damp soil at an elevation of 2,040 m at Pauai, Province of Benguet, Luzon, by E. D. Merrill, *no. 4744*, in flower and fruit, November 8, 1905. Also represented by *Merrill 4358*, base of cliffs at an elevation of 1,770 m, Baguio to Ambuklao, also in Benguet, flowers and fruit, October 24, 1905.

Obviously very closely related to the preceding, but sufficiently distinguished by its habit, narrower leaves, longer petioles, smaller flowers and seeds, and other characters.

ARALIACEÆ.

SCHEFFLERA Forst.

Schefflera williamsii sp. nov.

Arbuscula; floribus composito-umbellatis, umbellis 8- vel 9-floris, 7-meris, foliis alternis, digitatis, glabris, 8- vel 9-foliolatis, oblique angusteque ellipticis, abrupte acuminatis.

Inflorescence terminal, arising as two diverging branches, each bearing three lateral racemed umbels and three terminal subumbellately arranged umbels, total length of inflorescence 7–9 cm, peduncles of individual umbels 12–14 mm, pedicels in the mostly 8- or 9-flowered umbels 7–8.5 mm long, slender; calyx about 2.5 mm long, triangular, truncate at the apex, about 4 mm wide, not articulated with the pedicels; petals 7, valvate, apparently falling together, more or less connate especially at the apex, 3.5 mm long, 1.5 mm wide, oblong-ovate, bluntly acuminate at the apex, sessile on the margin of the calyx-tube; stamens 7, their filaments 1.7 mm long and 1.2 mm wide; ovary extending 1.2 mm beyond the calyx, 7-celled, few-ovuled, hemispherical, rounded into the style, which is 1.4 mm long, 1.6 mm wide at the base, ridged but not divided, truncate at the apex.

A woody shrub, growing on tree-trunks, with stems 1.2–1.5 m long and 3.5–4 mm in diameter, the bark gray, striate, glabrous; leaves alternate, digitate, glabrous, the petioles 7–10 cm long but less than 1 mm wide, the leaflets mostly 8 or 9, borne on petiolules 1.2–2 cm long, the lamina 4.5–6.5 cm long 1.2–1.8 cm wide, somewhat narrowly and obliquely elliptic, at the apex at first gradually and then abruptly contracted into an obtuse or subacute acumen 1.2–1.5 cm long, or sometimes decreasing by 2 or 3 abrupt contractions, at the base acute or cuneate, slightly winging the apex of the petiolule; base of petioles sheathing stem at leaf-insertions.

Type collected at an elevation of 1,950 m on Mount Apo, District of Davao, Mindanao, by R. S. Williams, *no. 2568*, in flower, March 31, 1905.

SAPOTACEÆ.

PALAQUIUM Blanco.

Palaquium polyandrum sp. nov.

Arbor; floribus plerumque in foliorum delapsorum axillis fasciculatis, subhexameris, sepalis distichis, exterioribus valvatis, interioribus in alabastro valde sub anthesi lente imbricatis, staminibus 24 vel pluribus; ovario 6–10-loculari, glabro; fructu 2–4-loculari; foliis magnis, obovatis vel oblanceolatis, pagina inferiori crebrissime minutissimeque lepidotis, junioribus tomentosis.

Flowers in fascicles of 2–4, mostly in the axils of fallen leaves, but sometimes truly axillary; pedicels 1.5–2.3 cm long, 1.2–2.5 mm thick, ferruginous-tomentose and sometimes grayish-tomentose: sepals 6, about 4–5.5 mm long, 4–5 mm wide, broadly ovate to orbicular, persistent in fruit, arranged in two rows, those of the outer row coriaceous, valvate, on their outer surface pubescent like the pedicels, acuminate at the apex, those of the inner row usually slightly wider than the outer, in bud strongly, at anthesis very slightly imbricate, glabrous, rounded at the apex, membranaceous on the margins; corolla oblanceolate in outline, 1.7–1.8 cm long, divided to within 2.5–3.5 mm of the base into 6 or very rarely 7 lobes, these lobes imbricate, oblanceolate, 4 mm wide, rounded or obscurely 2-cleft at the apex, glabrous or when young very shortly tomentose without; stamens 24–33, inserted on the corolla at about the level of the base of the lobes, and adnate to its tube below, filaments 6–8 mm long, anthers 5 mm long, lanceolate, cordate at the base, the connective produced to a point at the apex; ovary at anthesis 1.5 mm long, 2 mm wide, 6–10-celled, each cell with 1 ovule; style 2–3 cm long, subulate, blunt at the apex: fruit glabrous, spherical or ovoid, baccate, tipped by the persistent base of the style, attaining a length of 2.2 cm and a diameter of 1.9 cm, 2–4-celled, each cell containing 1 seed, traces of additional aborted cells often very distinct.

A tree attaining a height of 24 m, with a trunk 40 cm in diameter, containing little gum, the bark grayish, that of the ultimate branches brownish-gray, many-ridged and furrowed, shortly ferruginous-tomentose or glabrescent, conspicuously scarred by lenticels, the buds surrounded by very conspicuous oblong scales 1.7 cm long and 9 mm wide, argenteous without, pergamaceous; leaves borne on stout petioles 1.5–2.5 cm long, the lamina oblanceolate to obovate, 21–43 cm long, 7.5–16 cm wide, at the apex shortly and usually obtusely acuminate, acute at the base, glabrous on the upper surface, very densely and very minutely lepidote on the under surface, or when young somewhat ferruginous-tomentose; *midrib very prominent on the under surface, primary lateral* veins on each side of the midrib 17 or 18.

Type collected at Camp Keithley, Lake Lanao, Mindanao, by Mary Strong Clemens, *no. 1017*, in flower and fruit, April, 1907; also represented by *Mrs. Clemens 1154, 1155a*, September, 1907, and 5 unnumbered sheets, collected in May and June, 1907, all from the same locality; also by *Williams 2197, 2308, 2318*, all from Sax River, District of Zamboanga, Mindanao, February and March, 1905; the various specimens showing every stage of development from buds to what is believed to be mature fruit.

EBENACEÆ.

DIOSPYROS Linn.

Diospyros pauciflorus sp. nov.

Arbor; floribus ignotis; fructibus solitariis vel rarius binis, fere sessilibus, globoso-ovoideis, 4 cm diametro, 4- vel 5-locularibus, loculis dispermis, seminibus testa atra obtectis, albumine non ruminato; foliis alternis, petiolatis, olivaceis, coriaceis, lanceolatis vel anguste oblongis.

Fruits somewhat fleshy, glabrous, brownish or blackish when dry, ovoid-globose, 4 cm in diameter, solitary or rarely paired, almost sessile, probably originally axillary; the fruiting calyx 4-lobed, coriaceous, ferruginous-pubescent without, 1.4 cm long, divided for nearly half its length into 4 orbicular-ovate lobes with strongly revolute margins, forming a broad channel on their under side all the way to the nearly acute apex; fruits 4- or 5-celled, each cell containing 2 collateral seeds; the seeds oblong in outline, oblanceolate in section, 2.1 cm long, tapering to a rounded apex, the testa black, the albumen not ruminate.

A tree 12 m in height, with a trunk 12.5 cm in diameter, the smaller branches covered with blackish bark, that of the ultimate ones dark-gray to brown, glabrous, striate; leaves alternate, borne on rough channeled petioles 1–1.2 cm long and 2–3 mm in diameter, the lamina glabrous, entire, olivaceous, shining on the upper surface, narrowly oblong or lanceolate, 13–26 cm long, 4–5 cm wide, acute and somewhat decurrent at the base, at the apex tapering to an obtuse acumen 2 cm long; primary lateral veins on each side of the midrib 15–17, forming a vein about 5–8 mm from the margin, and a less conspicuous vein 2–3 mm from the margin, primary venation more conspicuous on the under surface of the leaf, the secondary and tertiary venation moderately reticulate, also more conspicuous on the under surface.

Type collected at an elevation of 300 m at Sax River, District of Zamboanga, Mindanao, by R. S. Williams, *no. 2317*, in fruit, February 28, 1905.

A very distinct species, probably constituting a new section of the genus.

GENTIANACEÆ.

SWERTIA Linn.

Swertia decurrens sp. nov.

Herba erecta, glabra, simplex vel basi furcata; floribus cymoso-paniculatis, tetrameris, viridibus, purpureo-maculatis; seminibus numerosis, minutis, marginibus serratis; foliis oppositis, ellipticis vel ovalibus, caulinis sessilibus, basi non connatis, decurrentibus, inferioribus petiolatis.

Flowers greenish with fine purple spots, cymose, the cymes forming an elongated, leafy, terminal panicle, few-flowered, attaining 5 cm in length, with narrowly lanceolate attenuate bracts at the base of the 0.3–1 cm long pedicels: sepals 4, lanceolate, 6.5–7 mm long, 1.5–1.8 mm wide, subacute at the apex, free to about 0.5 mm from the base, 3-nerved; corolla as long as the calyx, 4-lobed to about 1 mm from the base, the lobes 3 mm wide, oblong, canaliculate and acuminate at the apex, net-veined, very slightly curved to the right, each lobe having within at its very base a delicate flap forming with it a shallow sac; stamens 4, inserted near the base of the corolla, the filaments 3.5 mm long, the anthers 1 mm long; ovary ovoid, 6 mm long, 1-celled, with numerous ovules, becoming an early dehiscent capsule; style none, stigmas 2, flat, about 1 mm long; seeds very numerous, brown, flat, 0.6–0.7 mm long, 0.3 mm wide, the margins comparatively deeply serrate, especially at the extremities, and bordered by a very narrow white wing.

A perennial with nearly herbaceous, erect, hollow, 4-angled stems, simple or forked at the base, 25–40 cm high, and 2 mm in diameter including the wings formed by the decurrent bases of the opposite leaves, glabrous except sometimes for a few villous hairs upon the youngest leaves; the middle leaves the largest, sessile, 2.5–3.5 cm long, 1.2–1.4 cm wide, elliptic, acute at both ends, the lowest reduced in size, petioled, elliptic or oval, frequently shortly acuminate at the apex, all leaves membranaceous, probably yellowish-green, with 3 conspicuous purplish veins and on each margin an additional inconspicuous vein; smaller veins finely reticulate, but inconspicuous.

Type collected on Mount Santo Tomas (Tonglon), Province of Benguet, Luzon, by R. S. Williams, *no. 1529*, in flower and fruit, November, 1904.

A genus not hitherto reported from the Philippines.

VERBENACEÆ.

CALLICARPA Linn.

Callicarpa ovata sp. nov.

Frutex; floribus cymosis, breviter pedicellatis, parvis, tetrameris; staminibus stylisque exsertis; foliis ovatis, breviter petiolatis, ovatis vel junioribus ellipticis, margine serratis, basi truncatis, apice acuminatis, nervis utrinque 8–10.

Inflorescence cymose, 1.5–2 cm long, the peduncles 5–11 mm long, the various forkings inclined to one another at angles exceeding a right angle, the ultimate pedicels 2–4 mm long, the bractlets linear to oblanceolate, 0.7–0.8 mm long, the rachises and outer surface of the calyx ferruginous-stellate-tomentose or ferruginous-stellate-pubescent; calyx obliquely campanulate, 0.9–1.2 mm long, shallowly divided into 4 somewhat unequal lobes but not 2-lipped; corolla pink, 2.3–2.5 mm long, divided for one-half to one-third of its length into 4 equal broadly ovate rounded lobes 1 mm wide; stamens 4, filaments inserted about 0.5 mm from the base of the corolla and alternate with its lobes, spirally coiled when dry, when extended 2.7–3 mm long, anthers ellipsoid, 0.7 mm long; ovary sessile, subglobose, 0.5 mm in diameter, the style 5–6 mm long, caducous, at the apex expanded into a small obscurely 4-notched stigma; drupe subglobose, 2.5 mm in diameter, glabrous, containing 4 pyrenes, each pyrene 2 mm long, 1.3 mm in diameter, 1-celled, 1-seeded; seed ellipsoid, 1.3 mm long; 0.8 mm in diameter.

A slender shrub about 2 m high, the ultimate branches densely ferruginous-stellate-tomentose, gradually becoming smoother and ultimately glabrous, bark grayish, thickly but lightly striate; leaves opposite, borne on tomentose petioles 3–5 mm long, the lamina membranaceous, ovate or the youngest elliptic, 5.5–10 cm long, 3–6 cm wide, truncate at the base, acutely or obtusely acuminate at the apex, the margins serrate except at the base, the veins of all orders on the under surface densely stellate-tomentose, those of the upper surface slightly so; primary veins on each side of the midrib 8–10.

Type collected at an elevation of 180 m, near Darong, District of Davao, Mindanao, by R. S. Williams, *no.* 2577, in flower and fruit, April 9, 1905.

PREMNA Linn.

Premna benguetensis sp. nov.

Arbuscula; floribus cymosis, in paniculis ferrugineo-pubescentibus dispositis, viridescentibus, bilabiatis; calycis corollaeque lobis 5; staminibus 4, didynamis; ovario globoso, glabro, 1-pyreno, pyrenis 2- vel 4-locularibus; stylo 4 mm longo, apice brevissime furcato; foliis oppositis, siccis atro-viridibus, ellipticis, apice acuminatis; venis lateralibus utrinque 5–7, subtus luteis ferrugineo-pubescentibusque, conspicuis.

Flowers in terminal or lateral paniculately arranged cymes 2–5 cm long, the rachises of all orders and the calyx densely though shortly ferruginous-tomentose, the ultimate pedicels 1 mm long, bearing small bracteoles, bracteoles also present at the forkings of the inflorescence, linear or lanceolate, 1–10 mm long, increasing in size towards its base: flowers in all 4.5–5 mm long; calyx obliquely campanulate, 2–2.5 mm long, somewhat 2-lipped, the upper lip with 2 suborbicular obtusely acuminate lobes, the lower lip less deeply trifid, the triangular lobes sometimes subacuminate; corolla greenish-white, 3.3 mm long, 2-lipped for about half its length, the 2 lobes of the upper lip and the middle lobe of the lower rounded at the apex, the outer lobes of the lower lip acute, the corolla glabrous without, within hirsute for about 0.5 mm downwards from the middle, around the insertions of the stamens; stamens 4, didynamous, filaments 1 mm or 0.5 mm long, anthers ovate, cordate at the base, 0.4 mm long; ovary glabrous or nearly so, globose, 0.7 mm in diameter, style linear or slightly thickened upwards, attaining a length of 4 mm, at the apex bifid, the arms only 0.2 mm long: drupe subglobose, 4 mm long, 3.5 mm in diameter, with 1 pyrene, the latter 2- or 4-celled, each cell 1-seeded, the seeds elliptical, 3.5 mm long, 1 mm wide, shortly stalked at the base and apiculate at the apex, testa light-brown.

A bush or small tree 3.6 m high, the stems 5–12.5 cm in diameter, the branches with light-gray, striate, lenticellate, scarred bark, the youngest branches densely ferruginous-pubescent; leaves opposite, borne on blackish ferruginous-pubescent or glabrescent petioles 8–19 mm long, the lamina greenish-black, elliptical or ovate, 5.5–7 cm long, 2.3–3.2 cm wide, acutely or obtusely acuminate at the apex, rounded at the base, entire on the margins, glabrous, but the veins of both surfaces, especially the under, slightly to densely ferruginous-pubescent; veins conspicuous on the under surface, yellowish, lateral veins 5–7 on each side of the midrib.

Type collected at Baguio, Province of Benguet, Luzon, by R. S. Williams, *no. 1086*, in flower, June 10, 1904; also from the same locality, in fruit, *no. 1207*, June 21, 1904.

CAMPANULACEÆ.

CAMPANUMOEA Blume.

Campanumoea celebica Blume Bijdr. (1825) 727.

Collected at an elevation of 1,050 m at Todaya, District of Davao, Mindanao, by R. S. Williams, *no. 2583*, in flower and fruit, March 28, 1905.

A genus not hitherto reported from the Philippines. The specimens agree in all essential characters with the original description and with that in King & Gamble's Materials for a Flora of the Malayan Peninsula.

Distribution: India and southern China to Celebes.

COMPOSITÆ.

CONYZA Linn.

Conyza japonica (Thumb.) Less. Syn. Comp. (1832) 204.

Blumea copelandii Elmer Leafl. Philip. Bot. **1** (1908) 359.

LUZON, Province of Benguet, between Baguio and Sablan, *Williams 1467;* Baguio, *Elmer 8400;* Pauai, *Bur. Sci. 4332 Mearns;* without specific locality, *Bur. Sci. 2814 Mearns.* Also (*fide* E. D. Merrill) represented in the Kew Herbarium by *Loher 3639, 3647*, both also from Benguet.

EMILIA Cass.

Emilia javanica (Burm.) comb. nov.

Hieracium javanicum Burm. Fl. Ind. (1768) 174, *pl. 57, f. 1.*

Prenanthes javanica Willd. Sp. Pl. **3** (1804) 1534.

Emilia flammea Cass. Dict. Sci. Nat. **14** (1819) 406; Atlas **3** (1819?) *pl. 5.* (**64**: *pl. 91.*)

Cacalia sagittata Vahl Symb. **3** (1794) 91.

Emilia sagittata DC. Prodr. **6** (1837) 302.

Cacalia coccinea Sims Bot. Mag. **16** (1803) *pl. 564.*

This species is represented in the collections of the Bureau of Science by the following specimens:

LUZON, Province of Benguet, *Williams 1438, Bur. Sci. 2789 Mearns:* Province of Zambales, Mount Tapulao, *Bur. Sci. 4786 Ramos:* Province of Bataan, Lamao River, *Elmer 6668, 6999, Merrill 3944, Bur. Sci. 1594 Foxworthy, For. Bur. 2116 Borden, For. Bur. 2175 Meyer.* MINDANAO, Cotabato, *Copeland.*

Emilia prenanthoidea DC. Prodr. **6** (1837) 303.

LUZON, Province of Benguet, Baguio, *Williams 1430.* MINDANAO, Province of Misamis, Mount Malindang, *For Bur. 4615 Mearns & Hutchinson;* Lake Lanao, Camp Keithley, *Mrs. Clemens 140*, and an unnumbered specimen.

This species has not hitherto been reported from the Philippines. It is extremely similar to the preceding in general appearance, but is distinguished by its glabrous achenes.

EUPATORIUM Linn.

Eupatorium benguetense sp. nov.

Herba; inflorescentia corymbosa, capitulis 5-floris, involucri bracteis 4-seriatis, inaequalibus, obtusis; foliis lanceolatis vel ovatis, basi rotundatis vel acutis, apice subacutis.

Flowers forming a sessile or more rarely a peduncled, leafy-bracted, terminal corymb 2–6 cm long, the rachises of all orders ferruginous-tomentose, the heads 5-flowered; involucral bracts purple, 15–20, imbricated in 4 series of very unequal length, the outer 1–2.5 mm long, suborbicular, the innermost 4.5–5.5 mm long, 1.5 mm wide, oblanceolate, all rounded at the apex, the outermost pubescent along the middle of the outer surface and sometimes ciliate, the margins more or less transparent; pappus very pale-yellowish, 3.5–4 mm long, somewhat copious, minutely antrorsely barbed; corolla tubular, white to pale purple, 3.5–4 mm long, its 5 lobes equal, ovate, obtuse at the apex, 0.5 mm long; filaments about 0.8 mm long, anthers also 0.8 mm long, at the apex with an ovate obtuse or rarely acute transparent appendix 0.3 mm long; achenes 2–2.5 mm long, narrowly oblong, 5-angled, sparingly scabrid; style attaining a length of nearly 5 mm, cleft into two arms for about half this distance.

Herbaceous, 1–1.5 mm high, the stem striate, the youngest shoots densely ferruginous-pubescent, the older smoother, at length glabrescent; leaves opposite, borne on petioles 4.5–12 mm long, the lamina lanceolate or ovate, 2.6–6.6 cm long, 8–20 mm wide, the base rounded or acute, the margins coarsely serrate with 4–13 glandular teeth on each side, the apex resembling one of the teeth though much longer, not acuminate, when dry dark-green on the upper and pale-green on the lower surface, densely glandular on both surfaces, on the upper surface moderately pubescent on the veins, elsewhere subscabrid or glabrescent, the lower surface densely pubescent on the veins, elsewhere silvery-lepidote; primary lateral veins on each side of the midrib 3–6.

Type collected on Mount Santo Tomas (Tonglon), Province of Benguet, Luzon, by R. S. Williams, *no. 1976*, November 30, 1904; also represented by the following collections from the same province: Mount Santo Tomas, *Williams 1435;* Pauai to Baguio, *Merrill 4699;* Suyoc to Pauai, *Merrill 4723.*

Distinguished from *Eupatorium sambucifolium* Elmer by its more numerous, broader involucral scales, smaller, more coarsely serrate and less acuminate leaves, and other characters.

LACTUCA Linn.

Lactuca dentata (Thunb.) comb. nov.

Prenanthes dentata Thunb. Fl. Jap. (1784) 301.

Chondrilla dentata Poir. Suppl. **2** (1811) 328.

Youngia dentata DC. Prodr. **7** (1838) 193.

Ixeris Thunbergii A. Gray Mem. Am. Acad. II. **6** (1859) 397.

Lactuca Thunbergii Maxim. Bull. Acad. Petersb. **19** (1874) 530.

Lactuca Thunbergiana Hemsl. Jour. Linn. Soc. Bot. **23** (1888) 484.

Lactuca luzonica Vidal Rev. Pl. Vasc. Filip. (1886) 165.

Batanes Islands, Batan Island, Santo Domingo de Basco, *Bur. Sci. 3645 Fenix.* Luzon, Province of Nueva Viscaya, Bagabag, *Merrill 150:* Province of Benguet, Baguio, *For. Bur. 4947 Curran, Elmer 8404, Bur. Sci. 2512 Mearns;* Mount Tonglon, *For. Bur. 11099 Whitford;* Twin Peaks, *Elmer 6387;* without more definite locality, *Loher 3632, Bur. Sci. 2766, 2803, 2808, 2864, 3463 Mearns:* Province of Zambales, Iba, *Bur. Sci. 4787 Ramos;* Mount Pinatubo, *Bur. Sci. 2568 Foxworthy:* Province of Pampanga, Mount Abu, *Bur. Sci. 2040 Foxworthy:* Province of Albay, Mount Mayon, *Bur. Sci. 2926 Mearns.* Mindoro, Alag River, *Merrill 6143.* Negros, Canlaon Volcano, *C. S. Banks,* without number. Mindanao, District of Davao, Todaya, *Williams 2536, Copeland,* without number; Sibulan River, *Copeland 1312.*

Distribution, Japan, China, and Formosa.

NEW OR NOTEWORTHY PHILIPPINE PLANTS, VI.

By Elmer D. Merrill.
(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

During the past five years approximately 1,000 new species have been described from the Philippines, the material on which they were based being for most part of recent collection. In spite of the large amount of work accomplished, the number of new forms that are constantly being found is surprising, and our herbarium to-day contains several hundred undescribed species, while additional ones are found in nearly every collection that is made, especially in those from previously unexplored regions.

In the present paper representatives of six genera previously not known from the Archipelago are recorded. Eight species, first described from extra-Philippine material, are also here listed for the first time from the Philippines, and about sixty species are described as new. One new genus, *Sagittipetalum*, of the *Rhizophoraceae*, is described.

GRAMINEÆ.

ORYZA L.

Oryza manilensis sp. nov.

Annua, erecta, 1 ad 1.3 m alta: foliis flaccidis, 10 ad 25 cm longis, 6 ad 7 mm latis; paniculis laxis, 10 ad 15 cm longis, flaccidis, pauci-floris; spiculis 4 mm longis, arista 8 ad 10 mm longa.

An annual 1 to 1.3 m high. Culms slender, glabrous, the nodes 6 or 7, glabrous. Leaves flaccid, minutely scabrid when dry, 10 to 25 cm long, 6 to 7 mm wide; sheaths rather loose, shorter than the internodes, the ligules about 2.5 mm long. Panicles lax, 10 to 15 cm long, the branches slender, scabrid, usually drooping, few-flowered. Spikelets 4 mm long, the empty glumes narrowly lanceolate, acuminate, 1.5 mm long. Flowering glume oblong, granulate, spinescent-ciliate on the keel and ribs, its awn slender, straight, 8 to 10 mm long. Palea slightly exceeding the flowering glume, short-acuminate, spinescent on the keels.

Luzon, Province of Rizal, Antipolo, *Bur. Sci. 2194 Ramos*, March, 1907, growing in open wet places.

A species allied to *Oryza ridleyi* Hook. f., of the Malayan Peninsula and Borneo, differing from that species in its smaller spikelets, *fide* Hackel in lit.

CHLORIS Sw.

Chloris mearnsii sp. nov.

Caespitosa, perennis, usque ad 40 cm alta; culmis gracilibus, geniculatis; spicis 3, digitatis, gracilibus, longe exsertis; foliis linearibus, acuminatis, 5 ad 8 cm longis; spiculis imbricatis, atropurpureis, 3.5 mm longis, arista 1 cm longa.

A tufted perennial 40 cm high or less. Culms very slender, glabrous, geniculate below, the inflorescence long-exserted. Leaves 5 to 8 cm long, 2 to 4 mm wide, minutely scabrid, the sheaths longer than the internodes, the ligule consisting of a few long white hairs. Spikes 3, digitate, slender, 5 to 7 cm long, the spikelets imbricate, dark-purple. Empty glumes hyaline, 1-nerved, scabrid on the nerves, the first 1.2 mm long, linear, the second 3 mm long, linear-lanceolate, mucronate-acuminate. Flowering glume lanceolate, dark-purple, 3.5 mm long, scabrid, the tip with a slender straight awn 1 cm long. Palea equaling the glume, scabrid. Seed narrowly oblong, 2.5 mm long. Callus pilose. Rachilla produced 1 to 1.2 mm and bearing a minute, 0.5 mm long, glume, the awn slender, scabrid, 3 to 4 mm long.

LUZON, Province of Ilocos Norte, *Bur. Sci. 2294 Mearns*, January, 1907.

A species allied to *Chloris cynodontoides* Bal., *fide* Hackel in lit., but that species has blunt leaves, while in the present species they are long-acuminate.

CYPERACEÆ.

CAREX Linn.

Carex cryptostachys Brongn. in Duperr. Voy. Bot. (1829) 152; Clarke in Hook. f. Fl. Brit. Ind. **6** (1894) 714.

LUZON, Province of Rizal, *Bur. Sci. 1760 Ramos*, January, 1907: Province of Sorsogon, Sorsogon, *Elmer 7306*, November, 1905.

Malay Peninsula to southern China, south to New Guinea; new to the Philippines.

The former number cited was compared by me with authentic material in Herb. Kew, and the identification has also been confirmed by Herr G. Kükenthal. Elmer's specimen is manifestly the same.

ARACEÆ.

ALOCASIA Neck.

Alocasia heterophylla (Presl) comb. nov.

Caladium heterophyllum Presl Rel. Haenk. **1** (1827) 148.

Alocasia warburgii Engl. Bot. Jahrb. **25** (1898) 25; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 33.

Presl's type, preserved in the Prague herbarium, is identical with the type of *Alocasia warburgii*, direct comparison having been made by me in the Berlin herbarium, Dr. Engler concurring in the identity of the two species. Presl's name being the older is here retained.

MORACEÆ.

ARTOCARPUS Forst.

Artocarpus woodii sp. nov.

Arbor ca. 10 m alta, glabra; foliis anguste oblongo-obovatis, nitidis, 8 ad 15 cm longis, abrupte late acuminatis, basi cuneatis, integris, nervis utrinque 5 vel 6, prominentibus, anastomosantibus; fructibus axillaribus, pedunculatis, irregulariter 7–12-lobatis, 6 ad 9 cm diam., rugosis.

A tree about 10 m high, glabrous. Branches light-gray, the tips brown and with few appressed hairs. Leaves narrowly oblong-obovate, glabrous, shining, submembranaceous, entire, 8 to 15 cm long, 5 to 7 cm wide, the apex broadly and abruptly acuminate, the acumen retuse, narrowed below to the cuneate base; nerves 5 or 6 on each side of the midrib, prominent beneath, anastomosing near the margins, the reticulations lax; petioles 3 to 5 cm long, dark colored, pruinose. Fruit peduncled, the peduncles 5 to 7 cm long, solitary in the upper axils, subglobose, 6 to 9 cm in diameter, irregularly obscurely lobed, the lobes rounded, rugose, gray, the anthocarps truncate or depressed, 2 to 3 mm in diameter. Ripe seeds 6 to 12, about 2 cm long.

BUCAS (off the northeast coast of Mindanao), *Merrill 5259*, October 4, 1906. Growing in ravines along the forest border at an altitude of about 10 m above the sea, well characterized by its shining narrowly oblong-obovate leaves, prominent nerves, lax reticulations, and solitary, peduncled, rugose fruits. Dedicated to Major-General Leonard Wood, to whom I am indebted for the opportunity to explore botanically many of the remote islands in the southern Philippines.

ANONACEÆ.

GONIOTHALAMUS Blume.

Goniothalamus dolichopetalus sp. nov.

Arbuscula glabra; foliis oblongo-lanceolatis vel lanceolatis, usque ad 20 cm longis, subcoriaceis, acuminatis, basi acutis, nervis obscuris; floribus axillaribus, solitariis, 10 ad 12 cm longis; pedicillis ca. 4 cm longis.

A shrub about 1 m high, glabrous throughout, the branches terete, slender, light-gray. Leaves lanceolate to oblong-lanceolate, rarely oblanceolate, 11 to 20 cm long, 2.5 to 5 cm wide, subcoriaceous, dull, apex acuminate, the acumen blunt, base acute; nerves about 12 on each side of the midrib, obscure, distant, irregular, anastomosing, the reticulations nearly obsolete; petioles about 5 mm long. Flowers solitary, axillary, their pedicels slender, about 4 cm long, slightly thickened upwards. Sepals 3, triangular-ovate, acuminate, slightly pubescent, about 3.5 mm long, 3 mm wide. Outer petals linear-lanceolate, 10 to 12 cm long, 1 cm wide, somewhat narrowed towards the base and gradually narrowed upwards, submembranaceous, glabrous, flat; inner petals oblong to oblong-lanceolate, about 13 mm long, 5 to 6 mm wide, connivent, acuminate, glabrous, slightly clawed. Stamens many, 2.4 mm long, somewhat curved, their connectives short, triangular. Carpels indefinite, oblong, slightly pubescent, 1-ovuled; styles slender, 1.5 mm long.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9268, 9261 Whitford & Hutchinson*, January, 1908.

An undershrub in dipterocarp forests 30 to 60 m above sea level, a species well characterized by its very long flowers.

POLYALTHIA Blume.

Polyalthia venosa sp. nov.

Foliis oblongo-ellipticis, acuminatis, valde reticulato venosis, nervis utrinque ca. 9; floribus axillaribus et caulinis solitariis, pedicellatis; petalis elliptico-ovatis vel lanceolato-ovatis ca. 2 cm longis, pilosis.

A shrub or small tree 4 m high or less, the branches slender, terete, glabrous, brown, the branchlets densely ferruginous-pubescent. Leaves oblong-elliptical, 10 to 16 cm long, 3 to 6 cm wide, papyraceous, glabrous and shining on both surfaces except the midrib which is slightly pubescent, paler beneath, the base acute or rounded, apex sharply acuminate; nerves about 9 on each side of the midrib, distant, very prominent beneath, anastomosing, the reticulations very prominent; petioles about 3 mm long, densely pubescent. Flowers solitary, from the leaf-axils on the ultimate branchlets and from tubercles on the trunk, their pedicels slender, 1.5 to 3.5 cm long, densely ferruginous-pilose. Sepals 3, free, ovate, about 8 mm long, 6 mm wide, slightly narrowed below, apex acute, 7-nerved, pilose outside, glabrous within. Petals 6, elliptical-ovate to lanceolate-ovate, about 2 cm long, 6 to 11 mm wide, the inner three slightly narrower than the outer ones, somewhat narrowed below, apex acute, glabrous inside, rather densely pilose or pilose-hirsute outside. Stamens indefinite, 2 mm long, the anthers concealed by the truncate overlapping connectives. Carpels many, oblong, appressed-hirsute, 2 mm long; stigmas ellipsoid, pubescent; styles very short or none; ovules 2, subbasal. Fruit ellipsoid or ovoid, about 1 cm long, apiculate, slightly pubescent, each with two seeds.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9108, 9232 Whitford & Hutchinson*, December, 1907, in dipterocarp forests 15 to 30 m above sea level.

A species well characterized by its pilose flowers which are both axillary and cauline, and by its strongly nerved leaves.

Polyalthia elongata sp. nov.

Arbor glabra; foliis oblongis vel oblongo-lanceolatis, coriaceis, 30 ad 35 cm longis, basi cordatis, nervis utrinque ca. 16; petalis 4 ad 4.5 cm longis, oblongo-lanceolatis, glabris vel sparse pubescentibus.

A tree 16 m high, glabrous or nearly so throughout, the branches grayish-brown, rather slender, terete. Leaves 30 to 35 cm long, about 11 cm wide, coriaceous, shining, the base broad, cordate, the apex acuminate; nerves about 16 on each side of the midrib, very prominent beneath, the reticulations fine, indistinct; petioles very stout, 5 mm long. Flowers lateral (?), nearly glabrous, pedicels about 4 cm long. Sepals 3, broadly ovate, united below, acute, slightly pubescent, about 3 mm long. Petals 6, flat, glabrous, or with few scattered hairs, oblong-lanceolate, acute, the three outer ones 4 to 4.5 cm long, 11 to 13 mm wide, the three inner ones slightly shorter and narrower. Stamens indefinite, 1.1 mm long, connectives truncate, overlapping. Carpels indefinite, somewhat pubescent.

MINDANAO, District of Zamboanga, Port Banga. *For. Bur. 9456 Whitford & Hutchinson*, February, 1908, in forests at 50 m above the sea.

A species well characterized by its very long, strongly nerved and cordate leaves, the attachment of the inflorescence not being indicated and the specimens not showing the same. A very similar species, in fruit, from the same locality is represented by *For. Bur. 9113 Whitford & Hutchinson*, but the leaves are relatively narrower, not cordate at the base and have about 25 pairs of lateral nerves.

MELODORUM Dunal.

Melodorum rufum (Presl) comb. nov.

Anona rufa Presl Rel. Haenk. 2 (1835) 75.

LUZON, without locality, *Haenke* in Herb. Prague, native name *Apnit*, ex Presl.

After examining Presl's type in Herb. Prague I do not hesitate to refer this species to *Melodorum*, it apparently being allied to *M. latifolium*, differing from that species in its glabrous, acuminate leaves. Index Kewensis gives the locality of the species as "Am. trop." but on what authority is not known, probably, however, on the assumption that Presl was correct in describing the species as *Anona*, the genus being largely developed in tropical America, and represented in the Malayan region only by introduced and cultivated species.

OROPHEA Blume.

Orophea bracteolata sp. nov.

Arbor parva: foliis oblongis, usque ad 12 cm longis, breviter acuminatis, nervis utrinque ca. 9, valde obliquis; floribus in cymis axillaribus congestis, petalis interioribus valde unguiculatis, laminis rhomboideis.

A small tree, about 9 m high, the branches terete, dark-reddish-brown, glabrous, lenticellate, the ultimate branchlets somewhat ferruginous-pubescent. Leaves oblong, subcoriaceous, 9 to 12 cm long, 3 to 4 cm wide, base acute or rounded, often slightly oblique, the apex short-acuminate, somewhat shining, glabrous on both sides, except on the midrib and nerves beneath which are appressed-pubescent; nerves about 9 on each side of the midrib, oblique, curved-ascending, very prominent beneath; petioles 2 to 3 mm long, pubescent. Cymes axillary, densely ferruginous-pubescent, densely flowered, 1.5 cm long or less, the pedicels about 5 mm long, pubescent, with a large ovate, strongly acuminate, pubescent bracteole about 3.5 mm long, at about the middle. Sepals 3, ovate, acute, pubescent, about 3 mm long. Outer three petals broadly ovate, acute or slightly acuminate, ferruginous-pubescent, 4 to 5 mm long, 5- to 7-nerved; inner three petals about 7 mm long, the claw 3 mm long, the blade rhomboidal, 4 mm long, free. Stamens about 12, 1 mm long, miliusoid. Carpels many, pubescent, 1 mm long, the style very short. Fruit unknown.

LUZON, Province of Cagayan, San Vicente, *For. Bur. 7055 Klemme*, May, 1907, in dense flat forests slightly above sea level, Cag., *Panganauin*.

A species resembling *Orophea cumingiana* and *O. enterocarpoidea* in gross characters but readily distinguished by its large bracteoles.

Orophea luzoniensis nom. nov.

Orophea maculata Merr. in Govt. Lab. Publ. (Philip.) 35 (1906) 11; Philip. Journ. Sci. 1 (1906) Suppl. 54, non Scort.

In publishing the species under the specific name *maculata*, the fact was overlooked that the same name had previously been used for a different species of the same genus.

UNONA Linn. f.

Unona rubra sp. nov.

Arbuscula 1.5 m alta; foliis lanceolatis vel late oblongo-oblanceolatis, submembranaceis, acuminatis, basi inaequilateralibus, leviter auriculato-cordatis, subtus pallidis, glabris; floribus rubris, axillaribus, solitariis, ca. 2 cm longis.

A small shrub about 1.5 m high, the branches dark-gray, terete, slender, rather densely pubescent with short spreading hairs, especially the younger ones. Leaves lanceolate to broadly oblanceolate, about 20 cm long, 4 to 6 cm wide, pale, especially beneath, glabrous, submembranaceous, apex shortly acuminate, somewhat narrowed below to the inequilateral base which is auriculate-cordate; nerves about 15 on each side of the midrib, curved-ascending, anastomosing, distinct beneath, the reticulations obsolete or nearly so; petioles densely pubescent, about 3 mm long. Flowers few, red, solitary, in the upper axils, their pedicels, about 5 mm long, glabrous. Sepals 3, free, ovate, 7 mm long, 5 mm wide, acute, glabrous or with few hairs outside. Petals fleshy, coriaceous, oblong, obtuse or blunt, about 18 mm long, 4 to 5 mm wide, the sides parallel, nearly glabrous. Stamens indefinite, 2 mm long, connectives truncate, overlapping. Carpels about 15, oblong, 1.5 mm long, hirsute, each with 4 parietal ovules; styles ovoid, the stigmas minutely papillate.

BALABAC, *Bur. Sci. 480 Mangubat*, March 1, 1908, in forests.

A characteristic species, distinguishable by its glabrous pale leaves and solitary axillary red flowers.

POPOWIA Endl.

Popowia polyandra (Presl) comb. nov.

Bocagea polyandra Presl Rel. Haenk. 2 (1835) 77.

LUZON, Province of Sorsogon, *Haenke*, in Herb. Prague: Province of Batangas, *7724 Curran & Merrill*, November, 1907. NEGROS, *For. Bur. 4302, 5229, 5231, 7289 Everett*, June, 1906, and September, 1907; Gimagaan River, *Whitford 1561*, May, 1906. MINDANAO, District of Zamboanga, *For. Bur. 9275 Whitford & Hutchinson*, January, 1908; Lake Lanao, *Mrs. Clemens 1007*, April, 1907, and without number July, 1907.

A widely distributed species in the Philippines, extending from central Luzon to southern Mindanao, the only representative of the genus known from the Archipelago. After an examination of Presl's type in Herb. Prague, I am able to affirm the identity of the above-cited specimens, and accordingly transfer the species to the genus in which it properly belongs.

PHAEANTHUS Hook. f. et Thoms.

Phaeanthus ebracteolatus (Presl) comb. nov.

Uvaria ebracteolata Presl Rel. Haenk. 2 (1835) 77.

Uvaria tripetala Blanco Fl. Filip. (1837) 465, non Roxb.

Unona tripetala Blanco l. c. ed. 2 (1845) 324; ed. 3, 2: 236.

Phaeanthus cumingii Miq. Fl. Ind. Bat. 2 (1859) 51; Vidal Phan. Cuming. Philip. (1885) 93; Rev. Pl. Vasc. Filip. (1886) 42; Ceron Cat. Pl. Herb. (1892) 11; Merr. in Forest. Bur. Bull. 1 (1903) 20; Philip. Journ. Sci. 1 (1906) Suppl. 54.

Phaeanthus malabaricus Vid. Cat. Pl. Prov. Manila (1880) 16; F.-Vill. Nov. App. (1880) 7, non Bedd.

Phaeanthus nutans F.-Vill. Nov. App. (1880) 6, non Hook. f. et Thoms.

A very common and widely distributed, endemic species for which Presl's specific name is here adopted, being the oldest valid one. In January, 1908, I had opportunity to examine Presl's type, preserved in the Prague Herbarium, and consider it to be identical with Cuming's plant on which Miquel based his *Phaeanthus cumingii*.

MONIMIACEAE.

KIBARA Endl.

Kibara mollis sp. nov.

Omnibus partibus dense et molliter stramineo-fulvo-pilosis vel pubescentibus; foliis ellipticis vel elliptico-ovatis, membranaceis, 12 ad 16 cm longis, apice breviter acuminatis, nervis utrinque 5 vel 6; inflorescentiis paniculatis vel racemoso-paniculatis, paucifloris, solitariis, axillaribus, 6 ad 10 cm longis, ramis patentibus, inferioribus ca. 3 cm longis; receptaculis elliptico-ovatis, chartaceis, extus dense pilosis; carpellis ca. 20, pubescentibus; tepalis ovatis, glabris, acutis, ca. 0.5 mm longis.

A shrub or small tree very densely and softly pilose or pubescent throughout. Branches terete, slender. Leaves pale, elliptical or elliptical-ovate, densely pilose on both surfaces, membranaceous, 12 to 16 cm long, 4 to 8 cm wide, base acute, apex short-acuminate, the margins above unequally undulate-denticulate; nerves 5 or 6 on each side of the midrib; petiole 1.5 to 2 cm long. Inflorescence axillary, solitary, paniculate or racemose-paniculate, 6 to 10 cm long, densely pilose, the branches spreading, the lower ones about 3 cm long, the upper gradually shorter, each bearing 1 to 3 flowers. Flowers 3 to 4 mm long, their pedicels 1 to 2 cm long, the receptacle elliptical-ovate, chartaceous, externally densely pilose; carpels about 20, 2 mm long, pubescent; tepals ovate, glabrous, acute, about 0.5 mm long.

LUZON, Province of Rizal, Bosoboso, *Bur. Sci. 1070 Ramos*, July, 1906.

A very characteristic species, readily recognizable by its soft, dense, rather pale pubescence, which extends to all parts of the plant.

ROSACEÆ.

PYGEUM Gaertn.

Pygeum glanduloeum sp. nov.

Arbor usque ad 18 m alta; foliis oblongo-lanceolatis vel ovato-lanceolatis, acuminatis, coriaceis, subtus utrinque ad basin glandulis prominentibus impressis; racemis axillaribus, dense ferrugineo-pubescentibus; floribus subsessilibus, 5-meris.

A tree 6 to 18 m high. Branches glabrous, dark-reddish-brown, lenticellate, terete, the branchlets slender, the younger ones usually more or less pubescent. Leaves 9 to 16 cm long, 3 to 6 cm wide, oblong-lanceolate or ovate-lanceolate, coriaceous, glabrous and shining above except the midrib which is somewhat pubescent, the lateral nerves sometimes pubescent also, on the lower surface glabrous or slightly pubescent, rather slenderly acuminate, the acumen blunt, often apiculate, base acute or cuneate, with two very prominent basal glands, one on each side of the midrib, these glands deeply impressed and protruding on the upper surface of the leaf; nerves 5 or 6 on each side of the midrib, prominent beneath, anastomosing; petioles pubescent, becoming glabrous or nearly so, 5 mm long. Racemes densely ferruginous-pubescent, axillary, solitary, 9 cm long or less. Flowers white, fragrant, subsessile or very shortly pedicellate, each subtended by a small densely villous bracteole about 2 mm long. Calyx funnel-shaped, about 3.5 mm long, ferruginous-pubescent, the lobes 5, oblong, obtuse, villous, 1.5 to 2 mm long. Petals 5, resembling the sepals but somewhat oblong-rhomboid. Stamens about 20, unequal, their filaments glabrous, 2 to 4 mm long; anthers 0.3 mm long. Ovary ovoid, villous; style glabrous, 4 mm long; stigma disciform. Fruit glabrous or with few scattered hairs, red, about 1 cm wide, slightly compressed, about 8 mm long; seeds with pronounced flavor like those of *Prunus*.

LUZON, Province of Rizal, Bosoboso, *For. Bur. 3092 Ahern's collector*, May, 1905, also from the same province, *For. Bur. 1134, 3342 Ahern's collector; For. Bur. 10007, 10037 Curran*, February, 1908; *Merrill 1707*, March, 1903; *Loher 2223*, November, 1892: Province of Zambales, *Bur. Sci. 5029 Ramos*, December, 1907; *Hallier*, January, 1904; *For. Bur. 381 Maule*, March, 1904: Province of Bataan, Lamao River, *Williams 529, 642*, January, March, 1904; *For. Bur. 6317 Curran*, February, 1907; *Whitford 8, 84*, April, 1904; *For. Bur. 49 Barnes*, August, 1903; *For. Bur. 2064, 2366 Borden, 1905; For. Bur. 2629 Moyer*, February, 1905; *Elmer 6697*, November, 1904; Dinalupijan, *Merrill 1537*, January, 1903: Province of Laguna, Santa Maria Mavitac, *For. Bur. 10063 Curran*, February, 1908: Province of Benguet, Sablan, *Elmer 6110*, April, 1904. MINDORO, *For. Bur. 3719, 6898 Merritt*, March, 1906, 1907. Without locality, *Cuming 797*, 1836–40.

A very common and widely distributed species in Luzon, confused with *Pygeum latifolium* Miq., and distributed as such, readily recognized, however, by its subsessile flowers and very prominent glands at the base of the leaf, which strongly protrude on the upper surface. T., *Lago*, *Gupit*.

Pygeum preslii nom. nov.

Germaria latifolia Presl Epim. Bot. (1849) 221; Miq. Fl. Ind. Bat. 1¹ (1855) 401.

Pygeum latifolium Vidal Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 122; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 60 (in part), non *Pygeum latifolium* Miq. l. c. 361.

Pygeum arboreum F.-Vill. Nov. App. (1883) 76, excl. syn.; Vidal Sinopsis Atlas (1885) *t. 46, f. B*, non Endl.

This species is common and widely distributed in the Philippines, and is allied to the preceding, readily distinguished, however, by its rather long-pedicelled flowers and basal leaf glands which are not prominent and not impressed, being scarcely visible on the upper surface of the leaf and not at all protruding as in *Pygeum glandulosum* Merr. It has been considered as *Pygeum latifolium* Miq., but judging from the description of that species, the Philippine plant is different. Unfortunately both Presl and Miquel used the same specific name for what are apparently two distinct species, Miquel publishing his *Pygeum latifolium* without any reference to the earlier *Germaria latifolia* Presl, and not recognizing that Presl's species was in reality a true *Pygeum*. The use of the specific name *latifolium* under *Pygeum*, precludes the possibility of transferring Presl's earlier name, and accordingly the above new name for the Philippine plant is here proposed.

Pygeum clementis sp. nov.

Arbor glabra; foliis oblongis, acuminatis, usque ad 20 cm longis, nervis utrinque ca. 10, subtus utrinque ad basin glandulis concavis impressis; fructibus subcompresso-globosis, 1.5 ad 2 cm diametro.

A tree, glabrous or nearly so throughout, 10 to 15 m high. Branches dark-reddish-brown, glabrous, terete, lenticellate. Leaves oblong, coriaceous, dull or slightly shining above, 12 to 20 cm long, 4.5 to 8 cm wide, entire, acuminate, base rounded or subacute, with a small but prominent gland on each side of the midrib at the base, protruding on the upper surface; nerves about 10 on each side of the midrib, prominent beneath, anastomosing; petioles 5 to 7 mm long. Flowers not seen. Racemes axillary, solitary, in fruit 4 to 5 cm long, glabrous. Fruit glabrous, subcompressed-globose, 1.5 to 2 cm wide, 1 to 1.3 cm long, the pedicels 7 to 10 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 760, 966*, September, 1906, March, 1907, both specimens in fruit.

A species allied to *Pygeum preslii* Merr., and *P. glandulosum* Merr., differing from both in having twice as many lateral nerves, and in its much larger fruit.

LEGUMINOSÆ.

ADENANTHERA Linn.

Adenanthera intermedia nom. nov.

Mimosa virgata Blanco Fl. Filip. (1837) 737, non Linn.

Mimosa punctata Blanco l. c. ed. 2 (1845) 508; ed. 3, 3: 139, non Linn.

Adenanthera pavonina F.-Vill. Nov. App. (1883) 73; Vidal Sinopsis Atlas (1883) 24, *t. 44, f. B;* Rev. Pl. Vasc. Filip. (1886) 119; Phan. Cuming. Philip. (1885) 110; Perk. Frag. Fl. Philip. (1904) 7; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 62, non Linn.

LUZON, Province of Isabela, *For. Bur. 6645 Klemme,* March, 1907: Province of Zambales, Subic, *Merrill 1977,* April, 1903; *For. Bur. 6086 Aguilar,* January, 1907: Province of Pangasinan, Libtong, *Alberto 51,* March, 1904: Province of Bataan, Lamao River, *Merrill 3863,* August, 1904; *For. Bur. 1496 Ahern's collector,* August, 1904; *For. Bur. 1599, 2345 Borden,* August, 1904, January, 1905: *Bur. Sci. 1617 Foxworthy,* October, 1906; *Williams 230,* November, 1903; *Whitford 1256, 1286,* May, 1905: Province of Rizal, *For. Bur. 3164 Ahern's collector,* June, 1905; Province of Sorsogon, *Elmer 7315,* November, 1905. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 336,* March, 1906.

A species widely distributed in the Philippines, previously confused with *Adenanthera pavonina* Linn., to which it is closely allied, differing constantly in its seeds being about half jet-black and half bright red as in *A. bicolor* Moon. The leaflets are quite different from those of *A. bicolor* Moon, obtuse, elliptical or oblong-elliptical, as in *A. pavonina* Linn. The species seems to have the vegetative characters of *Adenanthera pavonina* Linn., and the seed characters of *A. bicolor* Moon.

PITHECOLOBIUM Mart.

Pithecolobium scutiferum (Blanco) Benth. in Lond. Journ. Bot. 3 (1844) 211; Miq. Fl. Ind. Bat. 1^{1} (1855) 30.

Mimosa scutifera Blanco Fl. Filip. (1837) 735; ed. 2 (1845) 507; ed. 3, 3: 138.

Pithecolobium lobatum F.-Vill. Nov. App. (1883) 75; Merrill in For. Bur. Bull. 1 (1903) 23; Philip. Journ. Sci. 1 (1906) Suppl. 62; Perk. Frag. Fl. Philip. (1904) 4; Vidal Phan. Cuming. Philip. (1885) 111; Rev. Pl. Vasc. Filip. (1886) 120; Ceron Cat. Pl. Herb. (1892) 72, in part, non Benth.

PHILIPPINES, without locality, *Cuming 475.* LUZON, Province of Cagayan, *For. Bur. 4294 Klemme,* June, 1906: Province of Bataan, Lamao River, *Whitford 1257,* May, 1905; *For. Bur. 726, 1687, 1933 Borden, For. Bur. 1441 Ahern's collector, For Bur. 6366 Curran:* Province of Rizal, Bosoboso, *For. Bur. 2007 Ahern's collector,* November, 1904; San Mateo, *no. 117,* Decades Philip. For. Fl.: Province of Laguna, Los Baños, *Williams 2053,* January, 1905; *Elmer 8410,* April, 1906: Province of Tayabas, *For. Bur. 6069 Kobbe,* December, 1906; Guinayangan, *Merrill 2013,* April, 1903: Province of Albay, *Francisco s. n.,* 1901. MINDORO, *For. Bur. 4073, 4099, 6211, 8570 Merrill;* Pinamalayan, *Merrill 2153,* May, 1903; Puerto Galera, *Merrill 3321,* October, 1903; Pola, *Merrill 2212, 2376, 2474,* May–June, 1903; Bongabon River, *Whitford 1422,* February, 1906. TICAO, *For. Bur. 1067 Clark,* May, 1904. MASBATE, *Whitford 1685,* October, 1906. GUIMARAS, *For. Bur. 233 Gammill,* January, 1904.

A widely distributed endemic species, correctly identified by Bentham with Blanco's *Mimosa scutifera* and transferred by him to *Pithecolobium*, but later[1] considered by him to be the same as *Pithecolobium lobatum* Benth., and reduced to that species. It is, however, very distinct from *Pithecolobium lobatum* Benth., both in its very deeply lobed pods and in the venation of the leaflets. Universally known in the Philippines as *Anagap*.

Pithecolobium pauciflorum Benth. in Lond. Journ. Bot. 3 (1844) 212.

This species was based on flowering specimens, *Cuming 1854*, collected in the Philippines, without locality given, and like the preceding species later reduced by Bentham to *Pithecolobium lobatum* Benth. It does not, however, appear to be the same as that species. Cuming's specimen is well matched by *Bolster 286*, Surigao, Mindanao, April, 1906, in fruit. I have seen no typical *Pithecolobium lobatum* Benth. from the Philippines.

ENTADA Adans.

Entada parvifolia sp. nov.

Scandens, subglabra; foliis bipinnatis, pinnis 2-jugatis; foliolis utrinque 8, oblongis, mucronatis, ca. 1.5 cm longis, 3 ad 5 mm latis; spicis ca. 15 cm longis, plus minus hirsutis; leguminibus glabris, 10 ad 25 cm longis, 4 ad 5.5 cm latis, seminibus nitidis, 2 cm diam.

Scandent, the branches slender, terete, brownish, glabrous. Leaves bipinnate, the rachis about 6 cm long, slightly pubescent when young, the terminal tendril 6 cm long or more; pinnae 5 to 8 cm long, the rachis slightly pubescent; leaflets oblong, chartaceous, about 8 pairs, about 1.5 cm long, 3 to 5 mm wide, the apex obtuse, strongly mucronate, margins revolute, nerves obscure; petiolules very short. Spikes about 15 cm long, many flowered, the rachis somewhat ferruginous-hirsute, the bracteoles lanceolate, acuminate, about 1.5 mm long. Flowers subsessile, the calyx glabrous, small, campanulate, about 1.8 mm in diameter, obscurely 5-toothed. Petals 5, glabrous, oblong, equal, 3.5 mm long, 1 mm wide. Stamens 10; filaments about 5 mm long; anthers 0.8 mm long. Ovary glabrous, narrowly oblong, 2 mm long; style about 4 mm long. Pod narrowly oblong, compressed, 10 to 25 cm long, 4 to 5.5 cm wide, somewhat acuminate at both ends, the valves shining, firmly coriaceous, dark-brown, glabrous; seeds shining, round, compressed, about 2 cm in diameter.

LUZON, Province of Zambales, *Bur. Sci. 4810, 5067 Ramos*, December, 1907; *Hallier*, January, 1904.

A species well characterized by its small leaflets and comparatively small pods; very distinct from the widely distributed *Entada scandens* Benth. Like *Entada scandens* Benth., the stem of this species yields a substitute for soap which is used by the natives of Zambales. Z., *Hinagui*.

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[1] Trans. Linn. Soc. 30 (1875) 575.

BAUHINIA Linn.

Bauhinia copelandii sp. nov. § *Phanera.*

Scandens; ramulis, subtus foliis, racemis, calycibusque plus minus pubescentibus; foliis ovatis vel oblongo-ovatis, integris, 5-nerviis, 7 ad 9 cm longis, basi cordatis, apice breviter acuminatis, acuminibus retusis; floribus racemosis; staminibus fertilibus 3, sterilibus 3.

Scandent, the branches and branchlets terete, slightly pubescent. Leaves ovate to oblong-ovate, 7 to 10 cm long, 4 to 6 cm wide, entire, not cleft, subcoriaceous, shining on both surfaces, glabrous above, beneath with few appressed hairs, the base broad, cordate, the apex shortly and broadly acuminate, the acumen retuse; nerves 5, prominent; petioles 1 cm long or less, glabrous or slightly pubescent. Racemes terminal, somewhat pubescent, the rachis 1.5 cm long or less, the pedicels slender, about 2.5 cm long. Calyx-tube cylindrical, about 7 mm long, 3 mm in diameter, pubescent, the lobes equal, lanceolate or oblong-lanceolate, shortly acuminate, pubescent outside, about 1 cm long, 3 mm wide. Petals obovate to oblong-obovate, slightly appressed-pubescent externally, about 1.5 cm long, 1.3 cm wide, short-clawed. Stamens 6, three fertile, three sterile. Ovary and style somewhat pubescent; stigma capitate. Fruit unknown.

MINDANAO, District of Davao, Todaya, *Copeland 1429*, October, 1904.

Among the Philippine species most closely allied to *Bauhinia leptopus* Perk., but with much larger flowers; apparently most closely allied to *Bauhinia cornifolia* Baker, of the Malayan Peninsula, but sufficiently distinct, ex descr.

Bauhinia subglabra sp. nov. § *Phanera.*

Scandens, glabra; ramulis pruinosis, nigricantibus nitidis; foliis subcoriaceis, glabris, 5 ad 7 longis, usque ad medium lobatis, lobis rotundatis; nervis ca. 11; racemis glabris; petalis oblongo-lanceolatis vel elliptico-lanceolatis, unguiculatis; staminibus fertilibus 3; ovario tomentoso.

Scandent, 3 to 5 m high, glabrous throughout except the tomentose ovary and style, and the petals which are slightly pubescent outside. Branches terete, lenticellate, gray, the branchlets terete, slender, blackish, somewhat shining. Leaves subcoriaceous, slightly shining, 5 to 7 cm long, 5.5 to 7 cm wide, suborbicular, the base cordate, cleft nearly to the middle, the sinus very narrow, the lobes rounded; nerves about 11, prominent; petioles slender, 4 to 5 cm long. Racemes terminal, glabrous, the rachis 3 to 6 cm long, black; pedicels 2 to 3 cm long; bracteoles none or caducous. Calyx cylindrical, about 1.4 cm long, 3 mm thick, the lobes glabrous, reflexed, narrowly oblong-lanceolate, about 2 cm long, 3 mm wide. Petals oblong-lanceolate to elliptical-lanceolate, nearly 3 cm long, long-clawed, slightly pubescent on the back, acuminate. Stamens 3, fertile; anthers 12 mm long. Ovary and style densely brown-tomentose; stigma capitate. Fruit unknown.

PALAWAN, Iwahig, *Bur. Sci. 821 Foxworthy*, April 30, 1906.

A species well characterized by being entirely glabrous, except the ovary, styles and petals.

Bauhinia dolichocalyx sp. nov. § *Lysiphyllum.*

Arbor ca. 10 m alta; foliis ovatis, integris, basi cordatis, apice breviter acuteque acuminatis, 10 ad 14 cm longis, nervis 7; inflorescentiis terminalibus, densissime fusco-tomentosis; calycis segmentis anguste lanceolatis, 4 ad 5 cm longis; staminibus fertilibus 10; leguminibus ca. 20 cm longis, 7 cm latis, glabris; seminibus 2, compressis, 3.5 cm diam.

A tree about 10 m high. Branchlets terete, lenticellate, somewhat brown-pubescent. Leaves subcoriaceous, ovate, 10 to 14 cm long, 11 cm wide or less, entire, the base broad, usually prominently cordate, the apex shortly and sharply acuminate, glabrous and shining above, somewhat pubescent along the nerves beneath; nerves 7, prominent; petioles 2 to 3 cm long, pubescent. Inflorescence terminal, short, the flowers racemosely disposed, densely brown-appressed-tomentose. Calyx tube and pedicels not differentiated, 7 to 8 cm long, gradually thickened upwards, densely brown-tomentose, the calyx lobes narrowly lanceolate or linear-lanceolate, 4 to 5 cm long, about 5 mm wide, densely brown-pubescent outside, subequal. Petals about 5 cm long, glabrous or nearly so, long-clawed. Fertile stamens 10. Ovary glabrous. Pods woody, about 20 cm long, 7 cm wide, glabrous, each with two rounded compressed shining seeds about 3.5 cm in diameter.

LUZON, Province of Batangas, *For. Bur. 7756 Curran & Merritt*, October 28, 1907.

A striking species, well characterized by its entire leaves, undifferentiated calyx tube and pedicel, very long calyx lobes, 10 fertile stamens, and rather large pods.

MUCUNA Adans.

Mucuna mindorensis nom. nov.

Mucuna acuminata Merr. Philip. Journ. Sci. 1 (1906) Suppl. 196, non Grah.

In describing the above species the fact was overlooked that the specific name *acuminata* had already been used. Accordingly the above new name is here proposed for the species.

GLYCINE Linn.

Glycine warburgii (Perk.) comb. nov.

Pueraria warburgii Perk. Frag. Fl. Philip. (1904) 87.

MINDANAO, Taumo, *Warburg 14664*, in Herb. Berol. (type); District of Davao, *DeVore & Hoover 368*, May, 1903; Santa Cruz, *Williams 2953*, June, 1905; Province of Surigao, Bagangа, *Merrill 5430*, October 6, 1906.

The plant is apparently *Glycine* and not *Pueraria*, and seems to be allied to *G. javanica* Linn. I have examined the type of *Pueraria warburgii* in Herb. Berol., and find that the other specimens here cited closely match it. According to Perkins l. c., a closely allied, if not identical form, is found in Celebes.

MEZONEURUM Desf.

Mezoneurum mindorense sp. nov.

Scandens; foliis bipinnatis, usque ad 35 cm longis, rhachidibus postice aculeis geminis ternisve recurvis armatis; pinnis ca. 12, 8 ad 10 cm longis; foliolis 8- ad 12-jugatis, oblongo-ellipticis, glabris, 1 ad 1.5 cm longis; paniculis terminalibus; leguminibus brunneis, nitidis, ca. 7 cm longis, monospermis, alis 5 mm latis.

Scandent, nearly glabrous throughout, the branches terete, dark-reddish-brown, with scattered stout recurved spines about 2.5 mm long. Leaves 35 cm long or less, bipinnate, the rachis with short but stout recurved spines in pairs, rarely in threes at the insertion of the pinnae; pinnae 12 or less, 8 to 10 cm long, the rhachis slightly pubescent; leaflets 8 to 12 pairs, oblong-elliptical, glabrous, submembranaceous, 1 to 1.5 cm long, 5 to 7 mm wide, paler beneath, the apex rounded, minutely apiculate, rarely slightly emarginate, the base acute or obtuse; nerves obscure; petiolules very short. Panicles terminal, in fruit 30 cm long or more, the branches somewhat pubescent. Flowers unknown. Pods glabrous, shining, about 7 cm long, about 2.2 cm wide in the middle, coriaceous, brown, somewhat semilunar in outline, the winged margin nearly straight, the other regularly curved, giving nearly the outline of a sector of a circle, the wing 5 mm wide, base and apex acute; seed solitary, in the middle of the pod, flat, circular in outline, 7 mm in diameter (immature).

MINDORO, Pinamalayan, *For. Bur. 5383 Merritt*, October, 1906, in thickets near sea level.

Var. inerme var. nov.

Differt a typo foliorum rhachidibus inermibus.

MINDORO, Bulalacao, *Bur. Sci. 1514 Bermejos*, August 30, 1906.

ERYTHROXYLACEÆ.

ERYTHROXYLUM P. Browne.

Erythroxylum cuneatum (Wall.) Kurz in Journ. As. Soc. Beng. 43^2 (1874) 35; Schulz in Pflanzenreich 29 (1907) 146.

Erythroxylum burmanicum Griff. Not. Pl. Asiat. 4 (1854) 468. *t. 581, f. 3;* Merrill in Forestry Bur. Bull. 1 (1903) 25.

LUZON, Province of Rizal, *Loher s. n.*, May, 1904; Bosoboso, *Bur. Sci. 1023 Ramos*, June, 1906: Province of Bulacan, *For. Bur. 7158 Curran*, June, 1907: Province of Camarines Sur, Pasacao, *Ahern 292*.

Tenasserim to the Malay Peninsula, Sumatra and Java. T., *Saling, Manambó*.

Erythroxylum platyphyllum sp. nov. § *Coelocarpus*.

Differt *E. cuneato* pedicellis brevioribus, ca. 2 mm longis, foliis majoribus, usque ad 11 cm longis, 6 cm latis.

A small tree, the branches terete, reddish-brown, glabrous. Leaves elliptical, submembranaceous, 6 to 11 cm long, 3 to 6 cm wide, the apex broad, rounded, the base acute, shining above, paler beneath, glabrous; nerves about 10 on each side of the midrib, not prominent; petioles 5 mm long or less; stipules 7 mm long, lanceolate, acuminate, two-keeled, puberulent on the keels. Flowers axillary, solitary or in pairs, their pedicels 2 mm long. Calyx lobes 1.2 mm long, ovate, acuminate. Petals oblong, obtuse, 3.5 mm long, 1.5 mm wide, the ligule nearly one-half as long as the petal. Staminal tube 1.5 mm long, the stamens 10, the filaments unequal, about 1.5 mm long; anthers 0.4 mm long. Ovary glabrous, the style about 3 mm long, cleft into three parts above (short styled flowers not seen). Fruit oblong, 8 mm long, 4.5 mm wide.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9285 Whitford & Hutchinson*, January 2, 1908, growing along the margins of mangrove swamps. The second species of the family for the Philippines.

RUTACEÆ.

LUVUNGA Ham.

Luvunga philippinensis sp. nov.

Scandens, inermis; foliolis oblongis vel oblongo-ellipticis, subcoriaceis, usque ad 25 cm longis, 10 cm latis; floribus in cymis racemosis paucifloris lateralibus dispositis; calycibus cupulatis, truncatis; petalis 3 vel 4, oblongis, ca. 1 cm longis, ovario 4-loculare.

A scandent shrub without spines, glabrous throughout, the branches gray or brownish. Petioles terete, 9 to 13 cm long, greenish; leaflets 3, their petiolules stout, 5 mm long or less, 15 to 25 cm long, 6 to 10 cm wide, subcoriaceous, shining, paler beneath, oblong to oblong-elliptical, the apex acuminate, the acumen blunt or retuse, base acute, margins entire; nerves 8 to 10 on each side of the midrib, irregular, somewhat prominent beneath, anastomosing. Inflorescence of small, usually 3-flowered, racemose cymes, borne on the branches below the leaves or in the leaf-axils, 1.5 cm long or less; pedicels 4 to 5 mm long. Flowers white, fragrant. Calyx cup-shaped, about 4 mm in diameter, truncate or very obscurely 5-toothed, its stipe 2 mm long. Petals 3 or 4, oblong, obtuse, imbricate, 9 to 10 mm long, 3.5 to 4.5 mm wide. Stamens 10, free; filaments stout, swollen, about 6 mm long; anthers erect, oblong, 3 mm long. Ovary oblong, 4-celled, quadrangular in cross section, about 3 mm long, 1.2 mm thick, scarcely narrowed into the stout style which is about as long as the ovary; stigma capitate. Fruit unknown.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9104, 9267 Whitford & Hutchinson*, December, 1907, in forests 30 to 40 m above sea level. The first representative of the genus to be found in the Philippines.

MELICOPE Forst.

Melicope currani sp. nov. § *Entoganum.*

Arbuscula glabra; foliis oblongo-obovatis vel oblongo-lanceolatis, acuminatis, simplicibus; paniculis axillaribus, usque ad 4 cm longis, paucifloris; floribus 4-meris, 2 ad 2.5 mm longis.

A shrub, glabrous throughout. Branches slender, brown, terete, the branchlets greenish. Leaves simple, membranaceous, oblong-obovate to oblong-lanceolate, apex acuminate, base cuneate, 11 to 17 cm long, 4 to 6 cm wide, shining; nerves 8 or 9 on each side of the midrib, irregular, somewhat prominent beneath, distant, anastomosing; petiolule about 1 cm long, the petiole 2 to 5 cm long, geniculate at the joint with the petiolule. Panicles small, axillary, peduncled, 4 cm long or less, the branches short, spreading. Flowers 4-merous, greenish-white, their pedicels 2 mm long. Calyx short, 4-toothed, the teeth acute. Petals oblong, acute, 2 to 2.5 mm long, 1 mm wide, valvate and with an appendage at the apex inside. Stamens 8, about 1 mm long. Ovary 4-lobed; style short; stigma 4-lobed.

LUZON, Province of Tayabas, *For. Bur. 9663 Curran*, March, 1908.

In general appearance resembling *Melicope luzoniensis* Engl., but characterized at once by its simple leaves. The same form has also been collected by Vidal (Herb. Kew).

CHISOCHETON Blume.

Chisocheton currani sp. nov. § *Euchisocheton, Paniculati.*

Foliis modice petiolatis, 2- vel 3-jugatis, petiolis rhachide petiolulisque fulvo-olivaceo-pubescentibus; foliolis oppositis, elliptico-oblongis vel elliptico-ovatis, basi acutis, apice breviter acuminatis, costa nervisque utrinque hirsutis: paniculis axillaribus, angustis, 9 ad 15 cm longis, pauce breviter ramosis, dense pubescentibus; floribus breviter pedicellatis; petalis 5, pubescentibus, ca. 16 mm longis; tubo cylindrico, 5-laciniato; ovario 2-loculare.

A small tree about 5 m high, the branches appressed-brownish-pubescent. Leaves about 20 cm long, the rachis, petiolules, midribs, and nerves on both sides of the leaflets densely olivaceous-brownish-pubescent or hirsute; leaflets subcoriaceous, opposite, 2 or 3 pairs, 8 to 11 cm long, 3 to 4.5 cm wide, apex short acuminate, base acute, the nerves and midrib on both surfaces pubescent or hirsute; nerves about 7 on each side of the midrib, prominent, the reticulations distinct; petiolules 5 to 7 mm long. Panicles pubescent, axillary, narrow, 9 to 15 cm long, the branches very short, spreading or ascending, few, 1 to 2 cm long. Calyx pubescent, cup-shaped, 4 to 5 mm long, the teeth short, rounded. Petals yellowish-white, about 16 mm long, 2 mm wide, pubescent outside, glabrous within. Staminal tube 13 to 14 mm long, cylindrical, free, appressed-hirsute on both sides, the apex 5-lobed, the lobes narrowly oblong, obtuse, 2.5 *mm* long, 0.7 mm wide. Stamens 5, the anthers sessile, 2.5 mm long, alternating with the teeth. Disk none. Ovary hirsute, narrow, 2-celled; style hirsute, about 10 mm long. Fruit globose, brown, 5 to 6 cm in diameter, the seeds 2.5 to 3 cm long.

LUZON, Province of Benguet, Baguio, *For. Bur. 4865, 4923 Curran*, August, 1906, in ravines in the limestone region at an altitude of about 1,500 m.

AGLAIA Lour.

Aglaia palawanensis sp. nov. § *Hearnia.*

Arbuscula ca. 5 m alta, ramis petiolis rhachide paniculisque dense ferrugineo-stellato-pubescentibus; foliis imparipinnatis, 2-jugatis, usque ad 20 cm longis; foliolis elliptico-ovatis, elliptico-lanceolatis vel ovato-lanceolatis, acuminatis, subcoriaceis, pallidis, utrinque glabris, costa subtus stellato-pubescente excepta; paniculis pyramidato-ramosis, multifloris, foliis subaequantibus; floribus pedicellatis; calycibus dense stellato-pubescentibus, profunde 5-dentatis; petalis 5.

A shrub or small tree about 5 m high, the branches, branchlets, petioles, rachis, petiolules, midrib of the leaflets beneath and the inflorescence rather densely stellate-ferruginous-pubescent. Branches slender, terete, brownish. Leaves 20 cm long or less, usually 2-jugate, the rachis, including the petiole, about 6 cm long; leaflets subcoriaceous, pale when dry, somewhat shining, opposite, the terminal one slightly larger than the lateral ones, elliptical-ovate to ovate-lanceolate, the apex acuminate, the base acute, 7 to 11 cm long, 2 to 3.5 cm wide; nerves about 9 on each side of the midrib, rather distinct beneath, the reticulations faint, petiolules 5 to 7 mm long, that of the terminal leaflet about 1 cm long. Panicles about as long as the leaves, the lower branches 5 to 8 cm long, the upper ones gradually shorter. Flowers white or pale-yellow, pedicellate. Calyx densely ferruginous-stellate-pubescent, 1 mm long, deeply 5-cleft, the lobes about 0.7 mm. long, narrowly ovate, acute. Petals 5, free, concave, glabrous, ovate, obtuse, about 1.2 mm long. Staminal tube truncate, broad, 0.5 mm long, glabrous. Anthers 5, inserted on the margin of the tube, exserted, broadly triangular-ovate, 0.3 mm long.

PALAWAN, Victoria Peak, *Bur. Sci. 689 Foxworthy*, March, 1906, on steep forested slopes along streams at an altitude of about 1,000 m.

Aglaia affinis sp. nov. § *Hearnia.*

Foliis breviter petiolatis, 2-jugatis; foliolis oppositis, elliptico-oblongis, pallidis, subcoriaceis, supra glabris, subtus leviter ferrugineo-lepidotis, apice acuminatis, nervis utrinque ca. 10; paniculis foliis subaequantibus, pyramidato-ramosis, dense ferrugineo-lepidotis; floribus subsessilibus; calycibus dense lepidotis.

A tree about 15 m high, the branches brownish, glabrous, striate, not lenticellate, the younger parts somewhat lepidote. Leaves 12 to 20 cm long, the rachis and petiolules rather densely ferruginous-lepidote; leaflets subcoriaceous, 2-jugate, 7 to 10 cm long, 2.4 to 5 cm wide, elliptical-oblong, pale, glabrous above, beneath somewhat ferruginous-lepidote, base acute, equal, apex acuminate; nerves about 10 on each side of the midrib; petiolules 2 to 5 mm long. Panicles terminal, pyramidal, about as long as the leaves, densely ferruginous-lepidote throughout, branched from near the base, the lower branches about 7 cm long, the upper ones gradually shorter, the branchlets densely many-flowered. Flowers yellowish, fragrant, about 1 mm long, the buds globose, subsessile. Calyx 5-toothed, lepidote. Petals 5, glabrous, about 1 mm long. Staminal tube about 0.8 mm long, crenate, glabrous, bearing on its margin 5 sessile anthers.

BALABAC, *Bur. Sci. 446 Mangubat*, March, 1906.

A species apparently allied to *Aglaia cumingiana* Turcz., and to *A. harmsiana* Perk., differing from the former in its densely lepidote inflorescence, nearly sessile flowers which are densely disposed, and its acuminate leaflets, and from the latter by having only two pairs of shorter leaflets, shorter panicles, and different indumentum, the branches and leaves in the species above described not being at all stellate-tomentose-lepidote, the scales being appressed and entire or only very minutely ciliate.

EUPHORBIACEÆ.

OMPHALEA Linn.

Omphalea philippinensis sp. nov.

Scandens, inflorescentiis exceptis glabra; foliis coriaceis oblongo-lanceolatis, acuminatis, nitidis, basi supra 2-glandulosis; floribus pedicellatis, minutis; fructibus dehiscentibus, 2.5 ad 3 cm longis.

A large woody vine, glabrous except the inflorescence. Branches terete, somewhat rugose-striate when dry, glabrous, light-gray or yellowish. Leaves alternate, oblong-lanceolate, 12 to 22 cm long, 3 to 7 cm wide, coriaceous, glabrous, shining, pale in drying, the margins entire, somewhat recurved, apex rather abruptly acuminate, the acumen 1 cm long or less, blunt, the base acute or obtuse; nerves about 9 on each side of the midrib, prominent beneath, curved, the reticulations distinct on both surfaces; petioles stout, 1.5 to 3.5 cm long, with two prominent glands on the upper surface at the juncture with the leaf. Inflorescence axillary, paniculate, about 40 cm long (or longer?), somewhat ferruginous-hirsute, the branches stout, spreading, the flowers many, pedicelled, fasciculate, the pedicels slender, thickened upwards, 6 to 7 mm long. Buds globose, 1.5 to 2 mm in diameter. Sepals 5, imbricate, glabrous, obovate or orbicular, about 2 mm long. Petals wanting. Anthers sessile. Pistillate flowers not seen. Fruit dehiscent, 2.5 to 3 cm long, the valves twisting in dehiscence, firmly coriaceous, glabrous, gray, the seeds glabrous, shining, ovoid, 1.5 to 2 cm long, somewhat flattened on the two inner sides, apparently three in each fruit.

LUZON, Province of Rizal, Antipolo, *Merrill 1716*, March, 1903; Santander, *Bur. Sci. 3270 Ramos*, June, 1907: Province of Tayabas (Infanta), *Whitford 821*, September, 1904. The same species is apparently represented by the following specimens in Herb. Kew: *Cuming 1468; Vidal 1712, 2380, 3875*, and *Loher 5213*, all from the Philippines.

The only representative of the genus known from the Philippines, about 12 species being known from tropical America, one from Queensland and one from Madagascar. The material available is not sufficient to draw up a complete diagnosis, flowers being immature and fruit opened, so that it is impossible to describe the entire fruit.

AQUIFOLIACEÆ.

ILEX Linn.

Ilex gracilipes sp. nov.

Arbor parva, 3 ad 4 m alta, glabra; foliis oblongo-ovatis vel elliptico-ovatis, membranaceis, acuminatis, margine apiculato-denticulatis; floribus 3- ad 5-meris, solitariis vel fasciculatis, axillaribus, longe pedunculatis; pedunculis ca. 1 cm longis, fructiferis longioribus.

A small tree 3 to 4 m high, glabrous, the branches and branchlets slender, terete, reddish-brown, lenticellate. Leaves oblong-ovate to elliptical-ovate, membranaceous, 2.5 to 5 cm long, 1 to 3 cm wide, opaque or obscurely minutely punctate, shining, base acute, the apex rather long-acuminate, the acumen apiculate, the margins regularly apiculate-denticulate; nerves 4 or 5 on each side of the midrib, not prominent, anastomosing; petioles slender, 5 mm long or less. Flowers solitary or in 2- to 4-flowered fascicles in the axils of the leaves, long-pedicelled, the pedicels about 1 cm long, much elongated in fruit. Calyx about 2 mm in diameter, 3- to 5-lobed, the lobes orbicular-reniform, 0.5 mm long the margins shortly obscurely ciliate. Corolla lobes 3 to 5, imbricate, orbicular, rounded, about 1.5 mm long, the tube 0.5 mm long. Stamens 3 to 5, inserted on the corolla and alternating with the lobes, the filaments and anthers each 0.8 mm long. Ovary usually 5-celled, with a single pendulous ovule in each cell; stigma capitate. Fruit subglobose or ovoid, 5 to 6 mm long, with about 15 longitudinal ridges, usually with 5 nutlets, the peduncles 2 to 3 cm long.

LUZON, Province of Benguet, *Williams 1047*, May, 1904; *Bur. Sci. 2839 Mearns*, April, 1907; *Elmer; Loher 5129:* Province of Zambales, Mount Tapulao, *For. Bur. 8060 Curran & Merritt*, December, 1907: Province of Bataan, Mount Mariveles, *Whitford 414:* Province of Rizal, Bosoboso, *Bur. Sci. 2115, 2677 Ramos*, February, May, 1907.

A very characteristic species readily recognizable by its solitary or fascicled, long-pedicelled flowers, very long-pedicelled fruits and membranaceous leaves which are apiculate-denticulate. The flowers are sometimes 3- to 5-merous on the same plants.

CELASTRACEÆ.

MICROTROPIS Wall.

Microtropis currani sp. nov.

Arbor parva, glabra, 4 ad 9 m alta; foliis coriaceis, nitidis, subtus pallidis, elliptico-ovatis, 4 ad 7 cm longis, breviter obtuseque acuminatis, basi acutis, margine revolutis; cymis axillaribus, solitariis vel fasciculatis, ca. 1.5 cm longis, 3-floris; floribus 4-meris; fructibus cylindraceis, elongatis, 1 ad 1.5 cm longis.

A small tree, glabrous throughout, 4 to 9 m high, the branches and branchlets terete, dark-reddish-brown or nearly black when dry. Leaves coriaceous, shining, pale beneath, elliptical-ovate, 4 to 7 cm long, 1.5 to 4.5 cm wide, the apex short and bluntly acuminate, the base acute, margins entire, revolute; nerves 5 or 6 on each side of the midrib, not prominent, the reticulations indistinct; petioles 1 cm long or less. Cymes axillary, solitary or two or three in each axil, 1.5 cm long or less, the peduncles about 1 cm long, each cyme usually 3-flowered. Flowers 4-merous, the sepals orbicular, rounded, the two outer ones 2 mm long, the two inner ones somewhat petaloid, 3 mm long. Corolla lobes 4, obovate or elliptical-obovate, rounded, about 3 mm long, united below. Stamens 4, attached to the corolla and alternating with its lobes, the filaments short, the anthers 0.5 mm long, broader than long. Ovary ovoid, glabrous. Fruit cylindrical, elongated, yellow when fresh, dark-reddish-brown when dry, short-apiculate, 1 to 1.5 cm long, about 6 mm thick, 1-celled, dehiscent, the pericarp coriaceous.

LUZON, Province of Benguet, Mount Tonglon, *For. Bur. 4966, 4970 Curran*, August, 1906; *Williams 1300*, October, 1904: Province of Zambales, Mount Tapulao, *For. Bur. 8071 Curran & Merritt*, December, 1907; *Bur. Sci. 4698, 5026 Ramos*, December, 1907.

The first species of the genus to be found in the Philippines, about 9 species being previously known, extending from British India to Ceylon, Cochin China and Java. The species here described differs from all the others in the genus by its 4-merous flowers.

EUONYMUS Linn.

Euonymus philippinensis sp. nov.

Euonymus timorensis Turcz. in Bull. Soc. Nat. Mosc. 31 (1858) 447; Lawson in Hook. f. Fl. Brit. Ind. 1 (1875) 610, saltem pro parte; F.-Vill. Nov. App. (1880) 46; Vidal Phan. Cuming. Philip. (1885) 103; Ceron Cat. Pl. Herb. (1892) 47, non Zipp.

Arbor parva, glabra, 3 ad 8 m alta; foliis subcoriaceis, nitidis, ellipticis, oblongo-ellipticis, vel anguste obovato-oblongis, basi acutis, apice acuminatis, integris vel versus apicem minute obscureque denticulatis; cymis axillaribus, laxe dichotomis, diffusis, 8 ad 10 cm longis; floribus 5-meris; sepalis petalisque fimbriatis.

A small tree, 3 to 8 m high, the branches reddish-brown or greenish, slender, terete. Leaves subcoriaceous, shining, elliptical, oblong-elliptical or narrowly obovate-oblong, 7 to 13 cm long, 3 to 6 cm wide, entire or slightly and obscurely denticulate towards their apices, the base acute, the apex short acuminate, the acumen acute or blunt, rarely retuse; nerves 5 to 7 on each side of the midrib, not prominent, distant, irregular, anastomosing, the secondary nerves and lax reticulations nearly as prominent as the primary veins; petioles 5 to 7 mm long. Cymes axillary, dichotomous, diffuse, 8 to 10 cm long, the peduncles 3 to 5 cm long, the flowers numerous, white, 8 to 10 mm in diameter, the bracts and bracteoles linear or acicular, the former about 3 mm, the latter 1 mm long. Sepals 5, orbicular to reniform, the margins shortly fimbriate. Petals obovate, narrowed below, not clawed, 5 mm long, fimbriate. Filaments 2 mm long; anthers 0.5 mm long. Fruit glabrous, red, broadly obovoid or turbinate, nearly 1 cm long, 1.5 cm in diameter, 5-lobed, the lobes rounded.

MINDORO, *Cuming 1552.* LUZON, Province of Benguet, *Elmer 6462*, June, 1904; *Bur. Sci. 3551 Mearns*, July, 1907; *Williams 1024*, October, 1904: Province of Rizal, *Bur. Sci. 1037, 1443, 4612 Ramos*, July, August, 1906; August, 1907: Province of Tayabas, Lagumanoc, *Merrill 3356*, November, 1903. MASBATE, *Merrill 3064*, August, 1903.

A species previously confused with *Euonymus timorensis* Zipp., which is however a synonym of *Euonymus javanicus* Blume. Most closely allied to *E. attenuatus* Wall., of British India and to *E. gibber* Hance, of Hongkong, differing from the former in its shorter cymes, bracts and bracteoles and in the shape of its leaves, and from the latter in its longer leaves and cymes, the leaves of Hance's species being rounded and retuse at the apex. Lawson[2] admits *Euonymus timorensis* Zipp., as a distinct species, giving its range as from Tenasserim or the Andaman Islands to Pegu, Timor, and the Philippines, the Philippine distribution being undoubtedly based on Cuming's number cited above. The Andaman Island reference is probably erroneous, as King[3] does not admit the species in his "Materials for a Flora of the Malayan Peninsula." Not having seen the other specimens examined by Lawson, I am unable to state whether or not they are identical with the Philippine plant, but it seems probable that they represent a different species, or that the Indian specimens are really the same as *Euonymus*

SIPHONODON Griff.

Siphonodon celastrineus Griff. in Calc. Journ. Nat. Hist. 4 (1844) 247, *t. 14*; Laws. in Hook. f. Fl. Brit. Ind. 1 (1875) 629; Miq. Fl. Ind. Bat. 1^2 (1859) 629; Koord. & Valet. Bijdr. Boomsoort. Java 7 (1900) 105.

LUZON, Province of Bataan, Lamao River, *Whitford 1284*, May, 1905: Province of Tarlac, *Garcia*, August, 1903: Province of Rizal, Bosoboso, *Bur. Sci. 1466 Ramos*, September, 1906. MINDORO, Bongabong River, *Whitford 1423*, February, 1906; *For. Bur. 4053 Merritt*, April, 1906. TICAO, *For. Bur. 1072 Clark*, June, 1904.

British India and Java.

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[2] Hook. f. Fl. Brit. Ind. 1 (1875) 610.

[3] *Journ. As. Soc. Beng.* 65^2 (1896) 343.

A peculiar genus, anomalous in the family, here reported from the Philippines for the first time; apparently widely distributed in the Archipelago, but variable. The genus contains the above species, *Siphonodon australe Benth.*, and *S. pendulum* Bailey, of Australia, and the following species, which is evidently undescribed.

Siphonodon pyriformis sp. nov.

Arbor parva, glabra, 5 ad 6 m alta; foliis coriaceis, nitidis, oblongo-ellipticis vel oblongo-lanceolatis, 7 ad 15 cm longis, basi acutis, margine obscure crenulatis; nervis utrinque 7 ad 10; fructibus pyriformibus, ca. 3 cm longis, crustaceo-carnosis, glabris.

A small tree, 5 to 6 m high, glabrous throughout. Branches and branchlets terete, dark-reddish-brown, lenticellate. Leaves alternate, coriaceous, glabrous, elliptical-oblong to oblong-lanceolate, rarely elliptical-ovate, 7 to 15 cm long, 3 to 6 cm wide, the base acute, apex shortly and obtusely acuminate or rather long acuminate, the margins obscurely crenulate; lateral nerves 7 to 10 on each side of the midrib, irregular, anastomosing, the secondary ones nearly as prominent; petioles 4 mm long or less. Fruit axillary, solitary, the peduncles 5 to 8 mm long, crustaceous-fleshy, glabrous, pyriform, about 3 cm long, 2 cm in diameter, shining; seeds scattered.

LUZON, Province of Benguet, *Elmer 5985*, March, 1904; *For. Bur. 5141 Curran*, August, 1906; *Bur. Sci. 2875 Mearns*, April, 1907.

A species allied to the preceding, readily distinguishable however by its pyriform fruits.

ICACINACEÆ.

STEMONURUS Blume.

Stemonurus laxiflorus (Miers) comb. nov.

Platea laxiflora Miers in Ann. & Mag. Nat. Hist. II **10** (1852) 111.

Gomphandra laxiflora Vidal Rev. Pl. Vasc. Filip. (1885) 103.

Cissus flexuosa Turcz. in Bull. Soc. Nat. Mosc. **31**^{1} (1858) 415.

The species is enumerated here to call attention to the reduction of *Cissus flexuosa* Turcz., it being based on the same number of Cuming's collection as was *Platea laxiflora*. Turczaninow's description also applies to the specimens of Cuming 891 that we have seen. Miers' name having priority, is here retained, but is transferred to *Stenomurus*, where the species apparently belongs. Planchon in his monograph of the *Ampelideae*[4] remarks concerning *Cissus flexuosa* "Est-ce bien un Ampélidée? Plus que douteux."

Stemonurus merrittii sp. nov.

Arbor 10 ad 12 m alta, inflorescentiis ramulis petiolisque puberulis; foliis papyraceis, obovato-ellipticis vel obovato-oblongis, acuminatis, ca. 20 cm longis; cymis axillaribus, 1 ad 2 cm longis; floribus sessilibus, fasciculatis; filamentis brevibus, glabris; fructibus anguste oblongis, 2 ad 2.5 cm longis, plus minus triangulari-compressis, sulcatis.

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[4] DC. Monog. Phan. **5** (1887) 424.

A tree 10 to 12 m high, the branches terete, nearly black, the branchlets somewhat compressed, yellowish-gray, puberulent. Leaves obovate-elliptical to oblong-elliptical, papyraceous, about 20 cm long, 8 to 10 cm wide, slightly shining, glabrous, paler beneath, the apex short-acuminate, the base rounded or subacute, margins entire; nerves 8 to 10 on each side of the midrib, prominent beneath, somewhat ascending, parallel, the reticulations obscure, very lax; petioles puberulent, about 1 cm long. Cymes axillary, solitary, 1 to 2 cm long, puberulent, rather congested, sometimes branched from the base, but more often branched above only, the branches short. Flowers yellowish or cream-colored, sessile, fascicled at the ends of the branchlets. Calyx puberulent, shallow, about 2 mm in diameter, truncate or very obscurely toothed. Petals 5, free, valvate, oblong, about 2 mm long, 1 mm wide, acute, puberulent outside, glabrous and with an obscure keel within. Stamens 5; filaments very short, about 0.5 mm long; anthers 1.2 mm long, deeply cleft at the base. Ovary glabrous, oblong. Fruit narrowly oblong, glabrous, 2 to 2.5 cm long, about 7 mm thick, compressed, triangular in cross-section, sulcate on one side, the other two sides with a rib or keel.

MINDORO, Pinamalayan, in the mountains, altitude 100 m, *For. Bur. 9916, 9915 Merritt*, April 2, 1908.

IODES Blume.

Iodes philippinensis *sp. nov.*

Iodes ovalis Vidal Phan. Cuming. Philip. (1885) 103; Rev. Pl. Vasc. Filip. (1886) 85, non Blume.

Ramis ramulis inflorescentiis foliisque plus minus ferrugineo-pubescentibus; foliis ovatis vel oblong-ovatis, membranaceis, usque ad 12 cm longis, basi late cordatis, apice acuminatis; floribus breviter pedicellatis, ca. 8 mm longis, plus minus hirsutis.

Scandent, the branches, branchlets, leaves, and inflorescence more or less softly ferruginous-pubescent, the stems yellowish- to reddish-brown, the ultimate branchlets very densely pubescent. Leaves opposite, ovate to oblong-ovate, rather strongly acuminate, base broad, cordate, membranaceous, pubescent on both surfaces, more densely so on the nerves and especially on the under surface, 5 to 12 cm long, 3 to 8 cm wide; nerves about 6 on each side of the midrib, very prominent beneath, the reticulations lax, distinct; petioles densely pubescent, 1 cm long or less. Cymes axillary and terminating the short lateral branches, pubescent, few-flowered, the peduncles short or elongated. Pedicels about 1 mm long, the calyx ovoid, 2 mm long, more or less hirsute, deeply 5-lobed, the lobes oblong-lanceolate, 1 mm long, acuminate. Corolla-tube cylindrical, more or less hirsute, about 7 mm long, the lobes 5, ovate-lanceolate, strongly acuminate, reflexed, about 3 mm long, 1 mm wide. Anthers about 1 mm long. Ovary narrowly obovoid, glabrous, about 1 mm long.

Fruit broadly oblong, somewhat compressed, 1.5 cm long, about 1 cm wide, somewhat hirsute, strongly reticulate.

PHILIPPINES, without locality, *Cuming 1532*. MINDORO, Calapan, *Merrill 987, 1287*, January, April, 1903; Pinamalayan, *For. Bur. 5407 Merritt*, October, 1906. ROMBLON, *Hallier*, January, 1904. MASBATE, *Merrill 3383*, November, 1903. CEBU, *Bur. Sci. 1709 McGregor*, September, 1906 (type). LEYTE, Palo, *Elmer 7108*, January, 1906. PALAWAN, *Bur. Sci. 729 Foxworthy*, March, 1906.

The specimen collected by Cuming, cited above, has been referred by Baillon[5] to *Iodes ovalis* Blume, but the Philippine plants appear to differ constantly from typical Javan material (Pl. Bogor. Exsicc. no. 27) in their differently shaped, more cordate and much more acuminate, thinner leaves, less dense pubescence, and very different inflorescence, in *Iodes ovalis* the inflorescence being about 20 cm long, and in *I. philippinensis* never more than 7 cm in length and usually much shorter.

URANDRA Thwaites.

Urandra luzoniensis sp. nov.

Arbor glabra, 12 ad 29 m alta; foliis alternis, ellipticis vel obovato-ellipticis, subcoriaceis, nitidis, usque ad 15 cm longis, breviter obtuseque acuminatis, basi attenuatis; cymis termininalibus 3 ad 6 cm longis; floribus 5-meris, ca. 5 mm longis; fructibus oblongo-ellipsoideis, 2 ad 2.5 cm longis.

A tree, glabrous throughout, except the inflorescence, 12 to 29 m high. Branches terete, light-gray, the ultimate branchlets usually reddish-brown. Leaves alternate, elliptical to obovate-elliptical, subcoriaceous, shining, paler beneath, glabrous, 7 to 15 cm long, 4 to 7.5 cm wide, the apex shortly and obtusely acuminate, sometimes obtuse, the base gradually narrowed and somewhat decurrent-acuminate; nerves about 5 on each side of the midrib, slender, distinct beneath, ascending, the reticulations very lax, nearly obsolete; petioles about 1 cm long. Cymes terminal, 3 to 6 cm long, dichotomous, the peduncles 1 to 3 cm long, the ultimate branches and pedicels more or less ferruginous-hirsute. Calyx short, cup-shaped, truncate or obscurely toothed, about 1.5 mm long and 1.7 mm in diameter. Petals 5, oblong-oblanceolate, acute, glabrous, 5 mm long, 1.5 mm wide, crested at the apex inside. Stamens 5; filaments 5 mm long, glabrous below, above on the inner side below the anther, and on the back opposite the anther covered with long weak hairs; anthers ovoid, 1.2 mm long. Ovary ovoid, glabrous; style conical. Fruit elliptical-oblong, glabrous, black when dry, 2 to 2.5 cm long, about 1 cm in diameter, slightly striate, the exocarp coriaceous, the seed similar in shape to the fruit, 1.5 cm long or less.

LUZON, Province of Bataan, Lamao River, *For. Bur. 711, 1926, 2949 Borden*, May, September, and March, 1904–05; *For. Bur. 562, 574 Barnes*, March, 1904: Province of Rizal, Bosoboso, *Merrill 2669*, June, 1903; *For. Bur. 2445, 2989 Ahern's collector:* Province of Cagayan, *For. Bur. 7077 Klemme*, May, 1907. MINDORO, *For. Bur. 6214 Merritt*, January, 1907.

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[5] DC. Prodr. 17 (1873) 23.

Urandra pauciflora sp. nov.

Arbor parva, glabra; ramulis tenuibus, glabris, teretibus; foliis ovatis vel oblongo-ovatis, membranaceis, valde acuminatis, alternis, basi acutis vel rotundatis; cymis axillaribus, paucifloris, ca. 4 cm longis; floribus ca. 3, longe pedicellatis, 4-meris, 4 mm longis.

A small tree, glabrous throughout except the slightly puberulent inflorescence. Branches and branchlets slender, terete, gray or brownish. Leaves alternate, ovate to oblong-ovate, membranaceous, glabrous, somewhat shining, entire, base acute or somewhat rounded, apex slenderly long-acuminate; nerves 5 or 6 on each side of the midrib, not prominent, the reticulations very lax, nearly obsolete; petioles 5 to 8 mm long, slender. Cymes axillary, slender, 3-flowered, obscurely puberulent, the peduncles about 2 cm long, the pedicels 1 to 1.5 cm long. Calyx short, obscurely 4-toothed, less than 1 mm long. Petals 4, about 4 mm long, free, or united in bud. Stamens 4; filaments as long as the petals, flattened, with a few long hairs on the back opposite the anthers and along the margins just below the anthers; anthers 0.6 mm long. Ovary oblong, truncate, glabrous. Fruit unknown.

MINDORO, near Lake Naujan, and Mount Halcon, *For. Bur. 6770, 4327 Merritt*, April, 1907, and June, 1906.

A species characterized by its few-flowered very slender inflorescence and 4-merous flowers, the anthers with but few hairs.

GONOCARYUM Miq.

Gonocaryum calleryanum (Baill.) Becc. Malesia 1 (1877) 123.

Phlebocalymna calleryana Baill. in Adansonia 9 (1869) 147.

Gonocaryum tarlacense Vidal Sinopsis Atlas (1883) 20, *t. 30, f. C.*; Rev. Pl. Vasc. Filip. (1886) 86; Ceron Cat. Pl. Herb. (1892) 46; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 86.

Gonocaryum sp. Merr. in For. Bur. Bull. 1 (1892) 34.

CAMIGUIN, (Babuyanes Islands), *Bur. Sci. 2987 Fenix*, June, 1907. LUZON, Province of Zambales, Botolan, *Merrill 2983*, June, 1903: Province of Pampanga, Arayat, *Merrill 1406*, March, 1903: Province of Principe, Baler, *Merrill 1036*, August, 1902: Province of Laguna, Los Baños, *Elmer 8317*, April, 1906: Province of Rizal, Bosoboso, *Merrill 1862, 2816*, April, July, 1903; *For. Bur. 1989 Ahern's collector*, November, 1904; *Bur. Sci. 4601 Ramos*, August, 1907; Decades Philip. Forest Fl. *no. 38*, March, 1904: Province of Bataan, Lamao River, *For. Bur. 636, 831, 1366, 1803, 2106, 2744 Borden*, April-December, 1904; *Elmer 6884, 6887*, November, 1904; *For. Bur. 2199, 2643 Meyer*, December, 1904; *Whitford 475, 1212*, April, July, 1904–05; *Williams 493*, January, 1904; *For. Bur. 6355 Curran*, March, 1907: Province of Tayabas, *For. Bur. 7853 Merritt & Curran*, November, 1907; Atimonan, *Whitford 709*, August, 1904; Lagumanoc, *Merrill 3360*, November, 1903; Pagbilao, *Merrill 1928*, April, 1903: Province of Camarines Sur, *Ahern 86*, March, 1902.

A species common and widely distributed in Luzon, the oldest specific name being here adopted. From the description given by Baillon, *Phelobocalymna calleryana* and *Gonocaryum tarlacense* are conspecific, but *Platea laxiflora* Miers, is a quite different species. The species seems to be very closely allied to the Malayan *Gonocaryum teysmannianum* Scheff.

ELAEOCARPACEÆ.

ELAEOCARPUS Linn.

Elaeocarpus foxworthyi sp. nov.

Arbor ca. 15 m alta; foliis elliptico-ovatis, ca 18 cm longis, coriaceis, obtusis, subtus ferrugineo-pubescentibus, nervis utrinque ca. 12, prominentibus, margine breviter obscureque denticulatis; fructibus ovoideis vel ellipsoideis, dense ferrugineo-pubescentibus, ca. 3.5 cm longis.

A tree about 15 m high, the branches, branchlets, petioles, leaves beneath, and above when young, panicles and fruits rather densely ferruginous-pubescent. Leaves elliptical-ovate, about 18 cm long, 10 to 13 cm wide, coriaceous, obtuse, rarely slightly and broadly acute, the base rounded to subacute, glabrous above when mature, except on the somewhat pubescent midrib and nerves, the margins minutely and distantly denticulate; nerves about 12 on each side of the midrib, very prominent, parallel, the reticulations very distinct beneath, subparallel; petioles 5 to 6 cm long. Flowers unknown. Infrutescence axillary, pubescent. Fruits ovoid or ellipsoid, about 3.5 cm long, 2.5 cm thick, very hard, obtuse, densely ferruginous-pubescent, with one mature seed.

PALAWAN, Iwahig, *Bur. Sci. 858 Foxworthy*, May, 1906; *For. Bur. 4158 Curran*, May, 1906.

A tree growing along the river, well characterized by its rather large, elliptical-ovate leaves, and hard, ferruginous, ellipsoid, rather large, fruits.

MALVACEÆ.

HIBISCUS Linn.

Hibiscus cannabinus Linn. Syst. ed. 10 (1759) 1149; Mast. in Hook. f. Fl. Brit. Ind. 1 (1874) 339; Hochr. in Ann. Conserv. Jard. Bot. Genèv. 4 (1900) 114.

LUZON, Manila. *Merrill 3801*, December, 1903: Province of Pangasinan, *Bur. Sci. 4904 Ramos*, December, 1907. MINDANAO, Province of Surigao, Bagunga, *Merrill 5434*, October, 1906.

Widely distributed in the tropics, cultivated; not previously reported from the Philippines.

FLACOURTIACEÆ.

HOMALIUM Jacq.

Several species of *Homalium* occur in the Philippines, all endemic, so far as is known at the present time. Some of the species are important timber trees, but as there has been considerable confusion in the group, due to misinterpretation of some of the previously described species, the following key to the Philippine forms has been made. The types of F.-Villar's species are no longer extant, but those of Vidal are preserved in the Kew Herbarium, and these have been examined. There are some manifest errors in the descriptions of the former author, which have given rise to much of the confusion in the Philippine representatives of the genus, and it is hoped that the following enumeration will clear up the doubtful points:

Stamens 1 opposite each petal (§ BLACKWELLIA).
  Leaves softly pubescent beneath .... 1. *H. barandae* Vid.
  Leaves entirely glabrous.
    Flowers 5–6-merous; petals subspatulate, somewhat broader than the sepals, hirsute; leaves crenate .... 2. *H. loheri* Merr.
    Flowers 6–7-merous; petals and sepals linear, equal, covered with very long spreading hairs; leaves entire .... 3. *H. panayanum* F. Vill.
Stamens 2 or more opposite each petal (§ MYRIANTHEIA).
  Petals spatulate, much exceeding the ovate-lanceolate sepals; flowers 4–5-merous .... 4. *H. bracteatum* Benth.
  Petals and sepals subspatulate, equal or subequal; flowers 5–8-merous.
    Flowers 5–6-merous; lateral nerves of the leaves about 6 .... 5. *H. villarianum* Vid.
    Flowers 7–8-merous; lateral nerves of the leaves 11 to 13. .... 6. *H. luzoniense* F.-Vill.

(1) **Homalium barandae** Vidal Cat. Pl. Prov. Manila (1880) 32; Sinopsis Atlas, (1883) 27, *t. 53, f. A;* Rev. Pl. Vasc. Filip. (1886) 141; Ceron Cat. Pl. Herb. (1892) 87; F.-Vill. Nov. App. (1883) 94, in part, excluding the description of the flowers.

LUZON, Province of Rizal, Bosoboso, *For. Bur. 2959, 3377 Ahern's collector,* April, September, 1905: Province of Batangas, *For. Bur. 7749 Curran & Merritt,* November, 1907.

The type of this species was from the Province of Manila (Rizal); and Vidal, in the original description, which is very short, speaks especially of the dense pubescence on the lower surface of the leaves, which is also very characteristic of the specimens above cited. It is the only Philippine species that has densely pubescent leaves. F.-Villar's description applies, at least in part, to an entirely different species, as he describes the flowers with fourteen stamens, which applies to the species of the section *Myriantheia.* The specimen cited by Vidal in his Revision can not be considered as the type. T., *Laing.*

(2) **Homalium loheri** sp. nov.

Arbor inflorescentiis exceptis glabra; foliis oblongo-ellipticis, subcoriaceis, breviter obtuseque acuminatis, 12 ad 17 cm longis, margine crenato-serratis, nervis utrinque 8 ad 10; inflorescentiis terminalibus, paniculatis, villosis, ramis elongatis; floribus fasciculatis, ebracteolatis, 5- vel 6-meris, pedicellatis; petalis subspatulatis, quam sepalis paullo longioribus; staminibus 5 vel 6; ovario villoso.

A tree, apparently of medium size. Branches terete, light-gray, lenticellate. Leaves alternate, subcoriaceous, shining, glabrous, oblong-elliptical, 12 to 17 cm long, 5 to 8 cm wide, the apex shortly and obtusely acuminate, the base acute, the margins crenate-serrate throughout; nerves 8 to 10 on each side of the midrib, prominent, anastomosing, the reticulations distinct; petioles about 5 mm long. Inflorescence terminal, villous, paniculate, the branches few, elongated, 12 to 20 cm long. Flowers in fascicles, the bracteoles, if any, very deciduous, the pedicels pubescent, 3 to 4 mm long, jointed to the calyx. Calyx tube narrowly funnel-shaped, pubescent, about 2 mm long, the lobes 5 or 6, oblong, 2 mm long, pubescent. Petals 5 or 6, slightly exceeding the calyx lobes in length, subspatulate, pubescent. Stamens one opposite each petal. Ovary villous; styles 4 or 5.

LUZON, Province of *Rizal, Loher 2210; Bosoboso*, Decades Philip. Forest Fl. *no. 251; For. Bur. 1975 Ahern's collector*, November, 1905.

A species closely allied to *Homalium barandae* Vid., the type, *Loher 2210*, having been identified at Kew with Vidal's species. The plant above described is at once distinguished by its entirely glabrous leaves, even in young specimens. T., *Laing*.

(3) **Homalium panayanum** F.-Vill. Nov. App. (1883) 94; Vidal Rev. Pl. Vasc. Filip. (1886) 141; Ceron Cat. Pl. Herb. (1892) 87.

Homalium grandiflorum Naves in Blanco Fl. Filip. ed. 3, *pl. 443*, non Benth.

GUIMARAS, *For. Bur. 262 Gammill*, January, 1904; *For. Bur. 4539 P. del Villar*, June, 1906. LUZON, Province of Zambales, *For. Bur. 8111, 8419 Curran & Merritt*, December, 1907; *Bur. Sci. 5051 Ramos*, December, 1907.

F.-Villar describes the species as having petals and sepals 10, stamens 10, rarely 20 or 30, while Vidal states that the petals do not appear to exceed 7 in number, the stamens two to three times as many as the petals. Our specimens show 6 to 7 petals and sepals, and an equal number of stamens, and I have accordingly included the species in the section *Blackwellia*. Vidal's statement, however, would place it in the section *Myriantheia*. The plate cited by F.-Villar, shows 7-merous flowers, and apparently 7 stamens, and our specimens agree perfectly with the figure. A species well characterized by its entire leaves and linear petals and sepals which are covered with long ciliate hairs. V., *Puyót*.

(4) **Homalium bracteatum** Benth. in Journ. Linn. Soc. Bot. **4** (1860) 37; Rolfe in Journ. Bot. **23** (1885) 213; Vidal Phan. Cuming. Philip. (1885) 115; Rev. Pl. Vasc. Filip. (1886) 142.

Homalium luzoniense Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 99, non F.-Vill.

PHILIPPINES, without locality, *Cuming 1109* (cotype). LUZON, Province of Bataan, Lamao, *For. Bur. 2071 Borden*, October, 1904, *For. Bur. 5473 Curran*, November, 1906: Province of Bulacan, Angat, *For. Bur. 11165 Aguilar*, April, 1908: Province of Pampanga, Mount Arayat, *Merrill 4210*, September, 1905: Province of Camarines, Pasacao, *Ahern 24, 72*, January, March, 1902.

A species well characterized by its 4- or 5-merous flowers, and dissimilar sepals and petals, the former being ovate-lanceolate, reflexed and much shorter than the latter, which are spatulate and erect or spreading. T., *Aranga*.

(5) **Homalium villarianum** Vidal Rev. Pl. Vasc. Filip. (1886) 142; Ceron Cat. Pl. Herb. (1892) 87.

Homalium sorsogonense Elmer Leafl. Philip. Bot. **1** (1908) 325.

LUZON, Province of Camarines Norte, *Vidal 791*, type in Herb. Kew: Province of Sorsogon, *Elmer 7311*, November, 1905, type of *H. sorsogonense* Elm.

After a careful examination of the specimens and descriptions of these two species, I can find no characters by which they can be separated, and accordingly Elmer's recently described species is here reduced. On Vidal's specimen the flowers are 6-merous, and on Elmer's specimen they are 5-merous, but this character alone is not sufficient to distinguish them, as in many species of *Homalium* the floral parts vary in number even on the same plant.

(6) **Homalium luzoniense** F.-Vill. Nov. App. (1883) 94; Vidal Rev. Pl. Filip. (1886) 141; Sinopsis Atlas (1883) 27, *t. 53, f. B.;* Ceron Cat. Pl. Herb. (1892) 87.

Homalium aranga Vidal l. c., as syn.

LUZON, Province of Tayabas, *For. Bur. 19, 24, Ware*, September, 1903, *For. Bur. 6037 Kobbe*, December, 1906. ALABAT, *Vidal 354*.

A species well characterized by its 7- or 8-merous flowers, narrow sepals and spatulate petals. T., *Aranga.*

Homalium foetidum Benth., has been reported from the Philippines by F.-Villar, Nov. App. 94, and by Ceron, Cat. Pl. Herb. 87, but both are probably erroneous identifications. F.-Villar reduces *Gordonia polysperma* Blanco, to *Homalium foetidum* Benth., but this is certainly an error. I can not identify Blanco's species with any known form of *Homalium*, and it may apply to some plant of a very different genus.

RHIZOPHORACEÆ.

SAGITTIPETALUM gen. nov.

Calyx basi bracteolis liberis; tubus brevis, ovarii basi adnatus; limbus 6-partitus, lobis lanceolatis, acuminatis, coriaceis, valvatis. Petala 6, basi disci carnosi inserta, unguiculata, laminis oblongo-ovatis, margine irregulariter lacerato-fimbriatis, basi valde sagittatis. Stamina 12, alterna breviora; filamentis capillaribus. Ovarium inferum, 1-loculare; ovulis 12, collateralibus, in axillis interioribus superioribus affixis, pendulis. Stylus filiformis, stigma simplex, disciforme.

Sagittipetalum mindanaense sp. nov.

Arbor parva, glabra; ramulis teretibus, junioribus compressis; foliis oppositis, petiolatis, subcoriaceis, nitidis, ellipticis vel oblongo-ellipticis, acuminatis, basi acutis; cymis in axillis superioribus, ca. 3-floris, brevibus; floribus mediocris, 6-meris.

A small tree, about 10 m high, glabrous throughout. Branches slender, terete, the younger ones somewhat compressed, reddish-brown, the tips resinous. Leaves elliptical to oblong-elliptical, 7 to 10 cm long, 3 to 5.5 cm wide, the apex acuminate, the base acute, entire, shining, subcoriaceous; nerves 6 or 7 on each side of the midrib, irregular, interarching near the margin, not prominent, the reticulation rather lax, petioles 1 cm long or less; stipules caducous, lanceolate, 1.2 to 1.5 cm long. Cymes solitary in the upper axils only, short, usually 3-flowered, the peduncle about 5 mm long, compressed, the bracts ovate, acuminate, about 3 mm long; pedicels very short, the bracteoles two, similar to the bracts, not united. Flowers greenish, 1 cm long. Calyx ovoid, cleft to the middle, the lobes 6, lanceolate, acuminate, erect, 2 mm wide at the base. Petals 6, clawed, alternate with the sepals, 5.5 mm long, the claw 2 mm long, the blade oblong-ovate, strongly sagittate at the base, the apex acuminate, the margins irregularly lacerate-fimbriate, 3 mm wide below. Stamens 12, 6 opposite the petals with slender filaments

4.5 mm long, 6 opposite the sepals with filaments 3.5 mm long; anthers 0.7 mm long. Ovary inferior, 1-celled; ovules 12 on a central placenta, pendulous from the inner upper angles; style slender, 7 mm long; stigma small, disciform. Fruit unknown, but the calyx accrescent, in the immature specimens 1.7 cm long, when mature probably much longer.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9171 Whitford & Hutchinson*, December 9, 1907, in the dipterocarp forest at an altitude of about 20 m above the sea.

A curious genus well characterized by its strongly sagittate petals, from which the generic name is taken, these being long-clawed and irregularly lacerate-fimbriate, its 6-merous flowers, 12 stamens, of which the 6 opposite the petals are longer than the 6 opposite the sepals, and its 1-celled ovary with 12 pendulous ovules. It is apparently closely allied to *Carallia* but seems to be generically distinct.

MELASTOMATACEÆ.

MEMECYLON Linn.

Memecylon densiflorum sp. nov.

Ramulis acute tetragonis, non alatis; foliis ovato-oblongis, coriaceis, nitidis, 4 ad 5.5 cm longis, 1-nerviis, nervulis transversalibus obsoletis, apice breviter obscure acuminatis, acuminibus obtusis, basi cuneatis; cymis axillaribus, subsessilibus vel breviter pedunculatis, fasciculatis, subcapitatis, densis, ca. 1.3 cm diam.

Erect, glabrous, the branches brown or grayish, slender, terete, the branchlets 4-angled. Leaves coriaceous, shining, ovate-oblong, 4 to 5.5 cm long, 1.5 to 2.5 cm wide, base acute, apex shortly obscurely acuminate, the acumen blunt, sometimes subobtuse; midrib prominent, the lateral nerves obsolete; petioles slender, 5 mm long or less. Cymes axillary, fasciculate, subsessile or with peduncles 2 to 3 mm long densely many-flowered, forming subcapitate heads about 1.3 cm in diameter, the pedicels ebracteolate, about 2 mm long. Calyx funnel-shaped, 1.8 mm long and wide, truncate. Petals ovate, acuminate, about 2 mm long, 1.2 mm wide. Filaments 3 mm long; anthers 1.2 mm long.

MINDANAO, Province of Surigao, *Bolster 368*, October, 1906; *Ahern 515*, February May, 1901, V., *Babagion*.

A species allied to *Memecylon cumingianum* Presl, but readily distinguished by its dense capitate inflorescence; apparently also allied to *M. pauciflorum* Blume.

MEDINILLA Blume.

Medinilla philippensis (Cham. & Schlecht.) comb. nov.

Axanthes philippensis Cham. & Schlecht. in Linnaea 4 (1829) 103.

LUZON, without locality given, but from Cavite Province between the town of Cavite and Taal Lake, *Chamisso*, in Herb. Berol. (type): Province of Cavite, Mendez Nuñez, *Bur. Sci. 1341 Mangubat*, August, 1906.

This interesting species was based on very fragmentary material, the type, which I have examined in the Berlin Herbarium, consisting of a single detached leaf and a single detached fruit. It is exactly matched by the specimen collected by Mangubat, cited above, which came from the same general region as the original. Unfortunately the specimens collected by Mangubat are poorly prepared, but I am able to add the following to the original imperfect description:

Branches terete, light-gray, densely tomentose. Leaves 8 to 12 cm long, 4 to 8 cm wide, the nerves 3 or 4 on each side of the midrib, curved-ascending. Cymes lateral, 4 cm long or less, few-flowered, densely tomentose; bracts narrowly obovate, about 1 cm long. Calyx obscurely 4-toothed, the teeth short, broad. Petals 4, about 9 mm long. Stamens 8, subequal; anthers 5 mm long.

The species is most closely allied to *Medinilla lagunae* Vidal but has quite differently shaped leaves. It differs from *M. halconensis* Merr., in its 4-merous flowers and more numerously nerved leaves, which are pubescent beneath only, while in *M. halconensis* they are pubescent on both surfaces.

Medinilla cogniauxii sp. nov.

Medinilla bracteata Cogn. in DC. Monog. Phan. **8** (1891) 601, in part (*Cuming 1335, 1487; Vidal*).

Differt *M. bracteatae* Blume foliis longioribus, inflorescentiis terminalibus, racemosis, multo longioribus, usque ad 20 cm longis, simplicibus.

A scandent or decumbent shrub 2 to 6 m high, the branches terete, slender, shining, glabrous, the branchlets densely stellate-plumose-tomentose. Leaves membranaceous, elliptical-lanceolate, acuminate, base narrowed, abruptly rounded and narrowly cordate, 7 to 12 cm long, 2 to 5 cm wide, glabrous above when mature, more or less stellate-tomentose on the nerves when young, beneath densely stellate-plumose-tomentose on the nerves and with scattered hairs on the lamina; nerves prominent beneath, two on each side of the midrib, the outer pair subbasal and extending to the middle of the leaf or above, the inner pair leaving the midrib some distance above the base and extending to the apex, rarely a third pair of short basal nerves present; petioles densely tomentose, 1 to 3 mm long. Racemes from the terminal axils only, 7 to 20 cm long, pendulous, slender, densely stellate-tomentose, the flowers usually arranged in whorls of threes, each node with three membranaceous, ovate, 5 to 8 mm long, 5-nerved, persistent bracts, which are somewhat stellate-tomentose; pedicels about 4 mm long. Calyx 4 to 5 mm long, truncate, ovoid, densely hirsute, the stiff hairs ciliate. Petals 5, narrowly obovate, obtuse, about 9 mm long, 4.5 mm wide. Stamens 10, subequal; anthers 3 mm long. Style 8 mm long. Each flower subtended by two persistent bracteoles, which are orbicular-ovate, obtuse, 7-nerved, membranaceous, about 12 mm long, somewhat tomentose. Fruit subglobose, setose, about 5 mm in diameter, enclosed by the persistent bracteoles.

LUZON, Province of Batangas, *Cuming 1487*, in Herb. Bur. Sci. MINDORO, Baco River, *Merrill 4035*, March, 1905; *McGregor 183, 200*, April, 1905.

A very characteristic species, confused by Cogniaux with *Medinilla bracteata* Blume, which is a quite different species. In January of the present year I

examined Blume's type in Herb. Leiden, and compared with it a specimen of *Cuming 1487*. Blume's specimen has an axillary and terminal somewhat branched inflorescence, much shorter than in the Philippine specimens referred here, shorter leaves and much smaller bracts. *Medinilla bracteata* Blume must be excluded from the known Philippine flora, as *Cuming 1335*, and *Vidal 777, 778, 1390*, are undoubtedly referable to the species above described, and not to *M. bracteata* Blume.

Var. angustifolia var. nov.

Differt typo foliis multo minoribus, lanceolatis, basi vix angustatis.

Stellate-plumose-tomentose as in the type. Leaves 6 cm long or less, 8 to 14 mm wide, not gradually narrowed below, the base rather abruptly broad-cordate. Racemes axillary, shorter than in the type, the bracts, bracteoles and flowers as in *M. cogniauxii*.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4567 Mearns & Hutchinson*, May, 1906.

Medinilla malindangensis sp. nov.

Frutex glabra; ramis teretibus, ramulis tetragonis; foliis verticillatis, quaternis, elliptico-ovatis, acuminatis, 5-nerviis, usque ad 5 cm longis; cymis axillaribus, paucifloris; floribus 5-meris.

A glabrous shrub. Branches terete, light-gray, the branchlets 4-angled, not winged, slender. Leaves whorled, 4 rarely 3 at each node, coriaceous, elliptical-ovate, 2.5 to 5 cm long, 1.5 to 2.5 cm wide, acuminate, base cuneate; nerves 5, rather prominent beneath, reticulations obsolete; petioles 2 to 3 mm long. Cymes lateral, 3 cm long or less, few-flowered, the rachis 1.5 cm long or less. Flowers unknown. Calyx in fruit cup-shaped, about 6 mm long, 5 mm in diameter, truncate, the limb somewhat produced, and with 5 very obscure teeth.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4557 Mearns & Hutchinson*, May, 1906.

A species apparently allied to *Medinilla crassinervia* Blume, but with very differently shaped leaves which are much smaller. Well characterized by its small, acuminate, 5-nerved, verticillate leaves.

Medinilla cephalophora sp. nov.

Glabra: ramis teretibus; foliis oppositis, papyraceis, oblongis, acuminatis, ca. 20 cm longis, 5-nerviis; inflorescentiis terminalibus (?); floribus 5-meris, in capitulis cylindraceis, 8 ad 12 cm longis congestis; bracteolis spatulatis.

Scandent, 6 m high, glabrous. Branches terete, glabrous, gray. Leaves opposite, papyraceous, oblong, acuminate, about 20 cm long, 7 cm wide, 5-nerved from the base, the base subacute or somewhat rounded; petioles 1.5 to 2.5 cm long, rather stout. Inflorescence terminal (?), the flowers racemosely disposed on the thickened rachis forming a rather dense cylindrical head 8 to 12 cm long, about 3 cm in diameter; rachis

5 to 7 mm thick, densely covered with pedicel- and bract-scars, setose; pedicels about 5 mm long, the bracteoles numerous, exceeding the flowers, about 18 mm long, spatulate, the limb elliptical-ovate, obtuse, 6 mm long, 5 mm wide. Calyx 4 mm in diameter, truncate. Petals 5, inequilaterally obovate, apex oblique-subtruncate, retuse-apiculate, 7 to 8 mm long, 5 mm wide. Stamens 10, subequal; filaments and anthers 4 mm long. Fruit ovoid, black, glabrous, about 1 cm in diameter, crowned by the persistent calyx.

NEGROS, Cadiz Nuevo, *For. Bur. 4223 Everett*, February, 1906. MINDANAO, Province of Surigao, *Bolster 290*, April, 1906.

A species quite different from any in the genus, characterized by its congested, cylindrical inflorescence. According to Everett the inflorescence is red and the flowers have an offensive odor when fresh.

Medinilla congesta sp. nov.

Ramis teretibus, glabris; ramulis, foliis subtus, paniculisque plus minus dense setosis: foliis oppositis 3-nerviis, oblongo-ellipticis, acutis vel breviter acuminatis, coriaceis, ca. 12 cm longis, sessilibus; inflorescentiis ca. 18 cm longis, longe pedunculatis, pedunculis gracilibus, densissime setosis; floribus 4-meris, congestis, valde bracteatis, prope ad apices ramulorum umbellatis.

A shrup, the branches light-gray, terete, glabrous, the branchlets slightly setose, the nodes very densely setose with subulate chaffy scales 1 cm long or less. Leaves opposite, coriaceous, pale, shining, oblong-elliptical, 10 to 14 cm long, 4 to 6.5 cm wide, margins somewhat revolute, sessile or subsessile, the base somewhat clasping, strongly 3-nerved, rarely with a supplementary pair of faint marginal nerves, the apex acute or short-acuminate, glabrous above, beneath with numerous long setose hairs, especially on the nerves. Inflorescence axillary (?), the peduncle very densely setose, about 12 cm long, slender, the flowers crowded at the apex, forming an oblong, rather dense head, 6 cm long and 3 cm thick, its branches about 1 cm long, densely setose, each bearing at its apex two or three, obovoid, slightly setose bracts about 12 mm long, and 5 to 7 short-pedicelled flowers, each flower subtended by three narrowly obovoid 1 cm long bracteoles, the pedicels densely setose, about 3 mm long. Calyx urceolate, the tube ovoid, 2 mm long, the limb produced, 2 mm long, somewhat spreading, truncate, with 4 nerves corresponding to teeth. Petals 4, about 10 mm long, 5.5 mm wide, narrowly inequilaterally obovoid, apex obtuse, oblique. Stamens 4; anthers 5 mm long.

MINDORO, Mount Sablayan, *For. Bur. 9760 Merritt*, March, 1908, in forests on exposed ridges at 1,000 m alt.

A species well characterized by its long-pedunculate, dense inflorescence which is densely setose, 4-merous, 3-bracteolate flowers, and sessile, strongly 3-nerved, opposite leaves.

ARALIACEÆ.

BOERLAGIODENDRON Harms.

Boerlagiodendron luzoniense sp. nov.

Arbuscula 1 ad 3 m alta; foliis palmatim 5- ad 7-lobatis, lobis oblongis vel obovato-oblongis, dentatis et grosse irregulariter sinuatis; umbellis plus minus dense castaneo-paleaceis; floribus 4-meris.

An erect shrub 1 to 3 m high. Branches somewhat thickened, light-gray, glabrous. Leaves submembranaceous, glabrous, suborbicular in outline, 15 to 25 cm long, palmately 5- to 7-lobed, truncate or cordate at the base, the lobes oblong to obovate-oblong, reaching to within 3 or 4 cm of the base, 5 to 7 cm wide, much narrowed below, apex short-acuminate, margins irregularly dentate and each lobe with two or three lobules, the lobules ovate or oblong-ovate, acuminate, 2 to 5 cm long, their sinuses round; petioles 10 to 30 cm long, rather slender, the basal portion with from 3 to 7 strong crests, their margins rarely slightly pectinate. Umbels terminal, compound, the peduncles 20 to 30, the whole inflorescence beset with numerous, dark-brown, narrow, paleaceous scales, the peduncles 2 to 3 cm long, subtended by numerous 1 cm long basal bracts, these bracts oblong, their margins somewhat fimbriate and their backs covered with narrow, brown, paleaceous scales, each peduncle bearing three branches, the middle one very short, the lateral ones 2.5 to 3 cm long, the bracts at the apex of the common peduncle and at the upper two-thirds of the lateral branches similar to the basal ones but smaller. Lateral heads about 1 cm in diameter, densely many-flowered, the flowers perfect, yellow, sessile, and subtended by numerous, dark-brown, chaffy bracteoles which are fimbriate and covered with setose scales. Calyx glabrous, obovoid, truncate, 2.5 to 3 mm long, 1.5 to 2 mm thick. Petals 4, ovate-elliptical, glabrous, united in bud, about 3 mm long, 2 mm wide. Stamens 4; anthers 1.5 mm long. Ovary 4-celled. Middle heads subsessile, the flowers sterile, pedicellate, the pedicels 5 to 6 mm long, the flowers glabrous, purplish, globose, 5 to 6 mm in diameter, 2-celled, rarely 3-celled.

LUZON, Province of Benguet, Baguio, *Elmer 5928*, March, 1904; *Williams 1123*, July, 1904; *For. Bur. 5088 Curran*, August, 1906; *Bur. Sci. 2729 Mearns*, April, 1907.

A species recognizable by its 4-merous flowers and dark-brown, densely paleaceous inflorescence, the specimens cited distributed as *B. pulcherrimum* (Vid.) Harms., to which species they do not seem to be closely allied.

Boerlagiodendron camiguinense sp. nov.

Differt a praecedente foliis 3–5-lobatis, lobis non sinuatis, usque ad dimidian partem laminae attingentibus, basi vix angustatis; floribus 3-meris.

Very similar to the preceding, the inflorescence with the same dense covering of brown, paleaceous scales. Leaves palmately 3- to 5-lobed, 15 to 20 cm long, subcoriaceous, glabrous, the base truncate or rounded, the lobes oblong, acuminate, coarsely apiculate-dentate but not sinuate and but slightly or not at all narrowed below, reaching to about the middle of the leaf. Inflorescence similar to that of *Boerlagiodendron luzoniense*, the perfect and sterile flowers much the same but the former with only three petals and three stamens, the ovary 3-celled.

CAMIGUIN, (Babuyanes Islands) *Bur. Sci. 4135 Fenix*, July, 1907, a shrub 1 to 1.5 m high, on slopes along trails.

Boerlagiodendron pectinatum sp. nov.

Arbor parva, glabra; foliis coriaceis, circiter 25 cm longis, usque ad medium palmatim 5-lobatis, petiolis ad basin seriatim manicato-cristatis, cristulis margine valde pectinatis; inflorescentiis glabris, ramulis omnibus aequalibus; floribus 5-meris.

A tree 7 to 8 m high, the branches glabrous. Leaves coriaceous, suborbicular in outline, about 25 cm long, base subtruncate, palmately 5-lobed, lobes reaching to about the middle of the lamina, oblong-ovate, acuminate, margins coarsely dentate, the sinuses narrow, obtuse at the base; petioles 13 to 15 cm long the base with a series of 3 or 4 crests which are strongly pectinate, their divisions being 6 to 10 mm long. Umbels compound, glabrous, primary branches about 25, subtended by numerous, coriaceous, ovate bracts about 3 mm long, the peduncles 1.5 to 2 cm long, each peduncle with a pair of narrowly ovate, acuminate bracts at the apex, each peduncle tripartite at the apex, its branches equal, or subequal, 1 to 1.5 cm long, the two lateral branches bearing heads of perfect flowers, the middle one with sterile flowers only; lateral heads 6 to 8 mm in diameter, densely many-flowered, flowers sessile, the basal bracteoles ovate, 1 to 1.5 mm long, their margins slightly fimbriate. Calyx oblong, truncate, 2 mm long, 1 mm thick, glabrous, slightly angular. Petals 5, oblong-ovate, in bud 2 mm long. Stamens 5; anthers 1 mm long. Ovary 5-celled. Flowers in the middle heads all pedicelled, pedicels 5 mm long, the flowers 3 mm long, their ovaries 3-celled.

BATAN (*Batanes Islands*), Mount Iraya, *Bur. Sci. 3775 Fenix*, June, 1907.

A species readily recognizable by its coriaceous leaves which are palmately lobed to the middle, the base of the petioles furnished with strongly pectinate crests, its 5-merous flowers and the secondary branches of the umbels being of the same length in both the lateral and middle heads.

Boerlagiodendron lineare sp. nov.

Arbuscula ca. 3 m alta; foliis usque ad basin palmatim 4–6-divisis, lobis linearibus, 15 ad 20 cm longis, 1 ad 1.5 cm latis, basi attenuatis; floribus 5-meris.

An erect shrub about 3 m high, the stems light-gray, glabrous, shining, somewhat scurfy at the tips. Leaves crowded at the apices of the branches, palmately cut into 4 to 6 linear segments which are free to the base, these segments glabrous, submembranaceous, 15 to 20 cm long, 1 to 1.5 cm wide, narrowed above to the acuminate apex, the base narrowly decurrent, the decurrent parts so narrow that the segments appear to be petiolulate, this portion 1 to 1.5 cm long, margins irregularly and slightly repand, the teeth minute, distant; nerves numerous, spreading; petioles 4 to 6 cm long, the base with 2 or 3 prominent crests. Umbels compound, with few, dark-brown, fimbriate scales, the peduncles about 10, 2 cm long, bracteate at the base and apex, each bearing at its apex a short-peduncled central head and two lateral branches, the central head composed of numerous, dark-brown, fimbriate-lacerate bracteoles (sterile flowers fallen), the lateral branches about 3 cm long, with a pair of bracts at about the middle, each bearing a terminal head of perfect flowers 1 cm in diameter or less, these heads also with numerous dark-brown lacerate-fimbriate bracteoles. Flowers sessile. Calyx more or less funnel-shaped, truncate, about 2 mm long, 1 mm in diameter. Petals and stamens not seen. Ovary 5-celled. Fruit ovoid, 5-ridged, 5-celled, about 3 mm long.

LUZON, Province of Pangasinan, *Bur. Sci. 4953 Ramos*, December, 1907.

A most characteristic species, at once recognizable by its 4 to 6 linear segments which are almost distinct enough to be considered as leaflets.

Boerlagiodendron pulcherrimum (Vidal) Harms in Engl. & Prantl Nat. Pflanzenfam. 3^8 (1904) 32.

Osmoxylon pulcherrimum Vidal Sinopsis Atlas 18 (1883) *t. 55, f. B.*

This is an imperfectly known species, the type being no longer extant. The material on which it was based was from Binangonan de Lampon, Province of Principe, Luzon, and the description states that it is a plant with digitately 7- to 9-lobed leaves, the lamina being 1 m long and the petioles 40 to 50 cm long. The figure shows 5-merous flowers, with the central head of sterile flowers strongly peduncled. It is doubtless allied to *Boerlagiodendron mindanaense* above described, but is quite different from that species both in its leaves and in its peduncled central heads. A full description of the species can not be written until it is again discovered.'

SCHEFFLERA Forst.

Schefflera foxworthyi sp. nov.

Glabra; foliis 7-foliolatis, foliolis ovato-lanceolatis vel oblongo-lanceolatis, apice sensim acuminatis, basi cuneatis, margine integris, revolutis; inflorescentiis terminalibus, ramis elongatis, rhachidibus brevibus; floribus 5-meris in imbellulis paucifloris dispositis.

Scandent, glabrous throughout, except some parts of the inflorescence, branches light-gray, somewhat thickened. Leaves 7-foliolate, the petioles 10 cm long, the stipule clasping; leaflets ovate-lanceolate to oblong-lanceolate, subcoriaceous, dull, 9 to 14 cm long, 3 to 5 cm wide, apex gradually acuminate, acumen sharp, base cuneate, margins entire, revolute; primary lateral nerves 5 or 6 on each side of the midrib, irregular, distant, the secondary ones nearly as prominent, anastomosing and forming looped submarginal nerves; petiolules 1 to 2.5 cm long. Inflorescence terminal, the rachis 2 or 3 cm long, rather stout, the branches 4 to 6, crowded, ascending, 20 to 30 cm long, glabrous, each subtended by a persistent, coriaceous, lanceolate, acuminate bract 2 to 3 cm long, the bracts when young densely floccullose. Flowers numerous, 5-merous, borne in 3- to 6-flowered umbels which are arranged along the primary branches, the peduncles 3 to 4 mm long, each subtended by a small lanceolate bracteole, the pedicels about as long as the peduncles. Calyx disciform, about 1.5 mm in diameter. Ovary 5-celled. Fruit 3.5 mm long, oblong-ovoid, the ridges 5, not prominent.

PALAWAN, Iwahig, *Bur. Sci. 796, 915 Foxworthy*, April and May, 1906.

A species allied to *Schefflera caudata* (Vid.) Merr., *S. clementis* Merr., and *S. longifrutescens* Elm., but readily distinguishable from all by the shape and venation of its leaflets, and various other characters.

ERICACEÆ.

RHODODENDRON Linn.

Rhododendron curranii sp. nov.

Arbuscula 2 ad 2.5 m alta, ramis ramulis foliisque glabris; foliis coriaceis oblongo-obovatis vel oblongo-oblanceolatis, acutis vel obtusis, basi sensim angustatis; pedicellis dense hirsuto-pilosis; floribus 2.5 ad 3 cm longis, purpureo-coccineis; staminibus 10, filamentis in parte inferiore plus minus hirsutis; ovario dense piloso.

A shrub 2 to 2.5 m high, the branches light-gray or brownish, glabrous, slender, terete, the ultimate ones 1.5 to 2 mm in diameter. Leaves whorled, 4 to 6 or 7 at each node, coriaceous, oblong-obovate to oblong-oblanceolate, glabrous and shining on both surfaces, paler beneath and with scattered small glands, 2.5 to 5.5 cm long, 0.5 to 2 cm wide, apex blunt or acute, gradually narrowed towards the cuneate or somewhat decurrent base, the margins slightly revolute; nerves obscure, about 4 on each side of the midrib; petioles 2 to 4 mm long. Flowers crimson-purplish, in terminal sessile fascicles, three or four flowers at the apex of each branchlet, the bracts smooth, imbricate, deciduous; pedicels densely hirsute-pilose, 1.5 to 2 cm long. Calyx an obscurely toothed ring about 4 mm in diameter. Corolla 2.5 to 3 cm long, slightly pubescent on the outside, the tube rather broad, the lobes orbicular-obovoid, rounded or retuse, 1.3 mm long, 1.5 mm wide. Stamens 10; filaments 1.5 to 1.8 cm long, 5-celled, slightly enlarged and hirsute below, glabrous above. Ovary oblong, 5-celled, densely pilose, 5 mm long; style glabrous, about 9 mm long.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8061 Curran*, December, 1907, in thickets on ridges at 2,000 m alt., also from the same locality *Bur. Sci. 4988 Ramos*, December, 1907.

A species closely allied to *Rhododendron lussoniense* Rendle, differing somewhat in the shape of the leaves, shorter corolla-tube and lobes and different color of the flowers. Rendle speaks of the flowers of *R. lussoniense* as having been pink or tinged with pink, but Whitehead's note on the type in the Herbarium of the British Museum says "flowers pure white."

Rhododendron malindangense sp. nov.

Arbor parva, ramis glabris, griseis, ramulis junioribus brunneis, puberulis; foliis coriaceis, pallidis, oblongo-ovatis, apice rotundatis vel emarginatis, basi cuneatis, utrinque squamulis glandulosis paucis notatis; bracteis ovatis, coriaceis, acutis, margine breviter ciliato excepto glabris; floribus solitariis, 2 cm longis, tubo cylindraceo; staminibus 10, inaequalibus, glabris; ovario 5-loculare, dense lepidoto.

A small tree about 7 m high, the branches terete, grayish, glabrous, the younger branchlets reddish-brown, puberulent. Leaves coriaceous, pale, oblong-ovate, the apex rounded or emarginate, the base cuneate, alternate or subverticillately arranged at the apices of the branchlets, glabrous except for the few scattered glandular scales on both surfaces, 1.5 to 3 cm long, 7 to 10 mm wide; nerves nearly obsolete; petioles 2 to 3 mm long. Bracts ovate, brown, rather thin, 6 mm long or less. Flowers red, solitary, few, the pedicels slender, 6 to 7 mm long, puberulent or pubescent. Calyx a small disk about 1.5 mm in diameter. Corolla 2 cm long, 4 to 5 mm in diameter, cylindrical, slightly lepidote, the lobes 5, ovate, rounded, 5 to 6 mm long, 4 to 5 mm wide, somewhat spreading. Stamens 10, unequal; filaments glabrous; anthers 1.4 mm long. Ovary oblong, 5-celled, about 3.5 mm long, densely lepidote; style glabrous, about 18 mm long.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4705 Mearns & Hutchinson*, May, 1906. Common in forests at about 1,800 m. alt.

SAPOTACEÆ.

PALAQUIUM Blanco.

Palaquium retusum sp. nov.

Arbor ca. 10 m alta; foliis anguste oblongo-obovatis vel oblanceolatis, coriaceis, glabris, 20 ad 35 cm longis, 7 ad 12 cm latis, apice rotundatis, retusis, basi longe sensim angustatis; nervis utrinque 13, prominentibus, ascendentibus; stipulis oblongo-ovatis, coriaceis, 1 ad 1.5 cm longis, persistentibus; floribus pedicellatis, dense ferrugineo-pubescentibus; ovario 9- vel 10-loculare.

A tree about 10 m high. Branches thickened, rugose, glabrous. Leaves crowded at the apices of the branches, narrowly oblong-obovate or oblanceolate, 20 to 35 cm long, 7 to 12 cm wide, apex broad, rounded, retuse, gradually narrowed from the upper third to the acute base, coriaceous, glabrous, shining, the midrib very stout, the lateral nerves 13 on each side of the midrib, very prominent, ascending, the reticulations not prominent; petioles stout, 1 to 3 cm long; stipules persistent, covering the apices of the branchlets, grayish, glabrous, coriaceous, oblong-ovate, acute, or obtuse, strongly keeled, 1 to 1.5 cm long. Flowers in few-flowered fascicles on the branches below the leaves; pedicels about 1.5 cm long, densely ferruginous-pubescent. Outer three calyx lobes valvate, densely ferruginous-pubescent, broadly ovate, acute or obtuse, coriaceous, about 6 mm long, the inner three somewhat petaloid, imbricate, nearly glabrous, or pubescent only on the median portion of the back, suborbicular, rounded or retuse. Stamens about 20. Ovary glabrous, 9- or 10-celled; styles nearly 2 cm long.

LUZON, Province of Benguet, Baguio, *For. Bur. 5095 Curran*, August, 1906; *Elmer 8523*, March, 1907.

A species remarkable for its elongated retuse leaves, prominent, persistent stipules and 9- to 10-celled ovaries. In most species of *Palaquium* the ovary is 6-celled, so that the present species is anomalous in this respect as well as in its persistent stipules. In all other characters it is a true *Palaquium*, and is accordingly described as such.

Palaquium elongatum sp. nov.

Arbor ca. 20 m alta; ramulis glabris; foliis lanceolatis vel anguste elongato-lanceolatis, acuminatis, coriaceis, supra glabris, subtus dense ferrugineo-pubescentibus nitidisque, 20 ad 25 cm longis, 4 ad 8 cm latis; nervis utrinque 14 ad 16, prominentibus; floribus axillaribus, solitariis, longe pedicellatis, dense ferrugineo-pubescentibus.

A tree about 20 m high, the branches thickened, gray, glabrous, the apices of the branchlets with numerous, narrowly lanceolate, about 1 cm long, coriaceous, glabrous stipules. Leaves lanceolate to narrowly oblong-lanceolate, coriaceous, 20 to 25 cm long, 4 to 8 cm wide, glabrous on the upper surface, beneath densely ferruginous-pubescent and shining, the midrib and lateral nerves glabrous or nearly so, apex short-acuminate, gradually narrowed below to the acute or slightly acuminate base; nerves on each side of the midrib 14 to 16, prominent, somewhat ascending, reticulations nearly obsolete; petioles about 4 cm long, glabrous or nearly so. Flowers in the leaf-axils, solitary, few, the pedicels ferruginous-pubescent, 5 cm long or less. Outer three calyx lobes ferruginous-pubescent, valvate, broadly triangular-ovate, acute, about 6 mm long, the inner three thinner, ovate, appressed-pubescent on the back. Corolla appressed-pubescent on the outside. Stamens about 20. Ovary ferruginous-pubescent, 6-celled; the style, in bud, glabrous, 4 mm long.

LUZON, Province of Tayabas, Mauban, *For. Bur. 6620 Reyes*, March, 1907.

A species well characterized by its narrow elongated leaves, and few, long-pedicelled flowers.

SIDEROXYLON Linn.

Sideroxylon stenophyllum sp. nov.

Arbor glabra, ca. 25 m alta; foliis anguste oblongo-lanceolatis, basi apiceque acuminatis, subcoriaceis, nitidis, usque ad 11 cm longis, 1.5 ad 2.5 cm latis; nervis utrinque 8 vel 9, prominentibus; fructibus ovoideis, glabris, ca. 5 cm longis; seminibus nitidis, 3.2 cm longis.

A tree about 25 m high, the branches terete, gray, glabrous, the terminal buds slightly pubescent. Leaves narrowly oblong-lanceolate, subcoriaceous, shining, glabrous, 7 to 11 cm long, 1.5 to 2.5 cm wide, the apex acuminate, the acumen blunt, the base decurrent-acuminate; nerves 8 or 9 on each side of the midrib, prominent, the reticulations obscure; petioles slender, 1 to 2 cm long. Fruit ovoid, glabrous, 5 cm long, apparently somewhat fleshy when fresh, but the pericarp brittle when dry, gray, shining, 5-celled, usually with but two matured seeds which are shining, brown, pointed at both ends, 3.2 cm long.

MINDORO, *For. Bur. 8626 Merritt*, January, 1908.

A very characteristic species, readily recognizable by its narrow few-nerved leaves and very large fruits; apparently allied to *Sideroxylon macranthum* Merr., but very different from that species.

OLEACEÆ.

JASMINUM Linn.

Jasminum macrocarpum sp. nov. § *Unifoliolata.*

Frutex scandens; ramis ramulisque brunneis, teretibus vel leviter compressis, gracilibus; foliis ovatis, simplicibus, subcoriaceis, supra nitidis, 8 to 10 cm longis, usque ad 7 cm latis, apice tenuiter acuminatis; petiolis articulatis; nervis utrinque ca. 9; paniculis axillaribus terminalibusque; fructibus nitidis, nigris, ca. 2 cm longis.

A scandent shrub, nearly glabrous throughout, the branches and branchlets terete or slightly compressed, slender, brownish, glabrous. Leaves simple, ovate, subcoriaceous, glabrous, shining on the upper surface, 8 to 10 cm long, 4 to 7 cm wide, the base rounded or acute, the apex slenderly and sharply acuminate; lateral primary nerves about 9 on each side of the midrib, not prominent, anastomosing, irregular; petioles 1 to 2 cm long, jointed at the middle or at the lower two-thirds. Flowers unknown. Panicles in fruit axillary and terminal, 10 cm long or less, slightly pubescent. Pedicels about 5 mm long. Calyx somewhat urceolate, 2 to 3 mm long, slightly pubescent, obscurely 6-toothed, in fruit much enlarged and thickened. Fruit ellipsoid or obovoid, glabrous, fleshy, shining, black when dry, about 2 cm long, with a single large seed.

LUZON, Province of Rizal, Bosoboso, *For. Bur. 3091 Ahern's collector*, May, 1905, *Bur. Sci. 1073 Ramos*, July, 1906; Tanay, *Merrill 2326*, May, 1903: Province of Bataan, Lamao River, *Whitford 394*, June, 1904.

A very characteristic species, readily distinguished by its subcoriaceous, sharply acuminate and shining leaves, and very large fruits.

Jasminum truncatum sp. nov. § *Unifoliolata.*

Subscandens, glabrum; foliis simplicibus, calycis limbo truncato, corollae tubo usque ad 1 cm longo, laciniis 7 ad 9, lanceolatis.

A subscandent shrub 2 to 3 m high, glabrous throughout. Branches slender, reddish-brown, terete. Leaves opposite, simple, ovate to oblong-ovate, the base broad, rounded, gradually narrowed above to the acuminate apex, 6 to 11 cm long, 3 to 6 cm wide; nerves about 11 on each side of the midrib; petioles 1 to 2 cm long, jointed at the lower fifth. Inflorescence terminal, lax, each ultimate branch bearing three flowers, the bracts subulate, about 2 mm long, the bracteoles smaller. Flowers white, fragrant. Calyx cup-shaped, 1.5 to 2 mm long, truncate, or with very minute obscure teeth. Corolla tube 1 cm long, the lobes 7 to 9, lanceolate, acute, nearly 1 cm long.

SIBUTU (Sulu Archipelago), *Merrill 5286*, October, 1906, in thickets along the seashore.

A species characterized by its truncate calyx.

LOGANIACEÆ.

GENIOSTOMA Forst.

Geniostoma philippinense sp. nov.

Arbuscula 2 ad 4 m alta; ramulis, subtus foliis, petiolis pedicellisque plus minus pubescentibus vel puberulis; foliis oblongo-lanceolatis, elliptico-lanceolatis vel ovato-lanceolatis, submembranaceis, nitidis, acuminatis, 9 ad 13 cm longis; nervis utrinque 5 ad 7, subtus prominentibus; floribus axillaribus, fasciculatis; ovario glabro.

A shrub 2 to 4 m high. Branches terete, slender, light-gray or brown, ultimately glabrous, the branchlets rather densely pubescent or puberulent. Leaves oblong-lanceolate, elliptical-lanceolate or ovate-lanceolate, submembranaceous, 9 to 13 cm long, 3.5 to 5.5 cm wide, base rounded or acute, apex acuminate, the upper surface glabrous and shining, usually blackish in drying, beneath, especially on the midrib and nerves, more or less pubescent with very short rather stiff hairs; nerves rather prominent beneath, 5 to 7 on each side of the midrib, anastomosing, the reticulations lax; petioles 4 to 7 mm long, usually rather densely pubescent. Flowers in 5- to 10-flowered axillary fascicles, the pedicels slender, pubescent, about 5 mm long. Calyx teeth triangular-ovate, acute. Corolla about 3 mm long, the lobes oblong-ovate, acute or acuminate, reflexed, about 1.5 mm long. Filaments short; anthers minutely puberulent, 1 mm long. Ovary glabrous. Fruit whitish, about 7 mm long; seeds numerous, 1.5 to 2 mm long.

LUZON, Province of Rizal, Bosoboso, *Merrill 1833*, April, 1903; *Bur. Sci. 2667 Ramos*, May, 1907; *Bur. Sci. 60 Foxworthy*, January, 1906; Montalban, *Loher 4105*: Province of Benguet, Twin Peaks, *Elmer 6451*, June, 1904, a more pubescent form, but apparently the same species.

The second species of the genus to be found in the Philippines, readily recognizable by its pubescence, its fascicled flowers and glabrous or nearly glabrous corolla-throat.

FAGRAEA Thunb.

Fagraea longiflora sp. nov.

Frutex scandens, glabra, pseudo-epiphytica; ramulis teretibus, crassiusculis; foliis ovato-ellipticis, subcoriaceis, 30 ad 40 cm longis, breviter acuminatis; nervis utrinque 8; floribus fasciculatis, terminalibus, sessilibus, congestis; corollae tubo cylindraceo, 10 cm longo.

A scandent pseudo-epiphytic shrub, glabrous throughout. Branches terete, thickened, 1.5 to 2 cm thick. Leaves crowded at the ends of the branches, elliptical-ovate, 30 to 40 cm long, 20 cm wide or less, subcoriaceous, tough in texture and not brittle when dry, the apex short-acuminate, the base decurrent-acuminate; nerves 8 on each side of the midrib, prominent; petioles about 4 cm long; stipules large. Flowers large, crowded in terminal fascicles or in depauperate sessile cymes. Calyx about 4 cm long, 5-lobed, the lobes about 2 cm long, imbricate, oblong-ovate, blunt or subacute, the bracteoles 2.5 to 3 cm long. Corolla white, the tube 10 cm long, cylindrical, slightly enlarged upwards, somewhat villous within, the lobes 5, elliptical-ovate, about 4 cm long. Anthers about 7 mm long. Fruit unknown.

LUZON, Province of Laguna, Mount Banajao, *For. Bur. 8026, 8028 Curran & Merritt*, November, 1907, in forests at an altitude of about 700 m.

A very characteristic species, well distinguished by its long sessile or subsessile flowers which are densely crowded into terminal fascicles or depauperated cymes.

Fagraea auriculata Jack in Malay Miscel. 2 (1822) 82; Blume Rumphia 2 (1836) 26, *t. 72;* Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 83.

PALAWAN, Mount Victoria, *Bur. Sci. 642 Foxworthy*, March, 1906.

British India to the Malay Peninsula and Archipelago; not previously reported from the Philippines.

MITREOLA Linn.

Mitreola oldenlandioides Wall. Cat. (1828) no. 4350; DC. Prodr. 9 (1845) 9; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 79.

LUZON, Province of Pangasinan, *Bur. Sci. 4852 Ramos*, December, 1907: Province of Bulacan, near Norzagaray, *Yoder 126*, December, 1906.

British India to the Malay Archipelago, Australia and the Caroline Islands. The first representative of the genus to be found in the Philippines.

APOCYNACEÆ.

CARRUTHERSIA Seemann.

Carruthersia macgregori comb. nov.

Ellertonia macgregori Merrill in Govt. Lab. Publ. (Philip.) **35** (1906) 59.

A reëxamination of the type material, and study of additional specimens collected by Mrs. Clemens in Mindanao, no. 756, September, 1906, and without numbers, April and June, 1907, leads me to refer this species to *Carruthersia*, the second species of the genus to be found in the Philippines. It is closely allied to *Carruthersia pilosa* (A. DC.) F.-Vill., but is readily distinguished by its glabrous leaves. The stamens are very slightly united and the two lobes of the disk alternating with the carpels are present. The genus *Ellertonia* is thus to be excluded from the Philippine flora.

STROPHANTHUS DC.

Strophanthus erectus sp. nov.

Frutex erecta, 1 ad 2 m alta; foliis submembranaceis, elliptico-ovatis vel oblongo-ovatis, breviter acuminatis, nervis utrinque 5 vel 6; cymis paucifloris, bracteis et lobis calycinis lanceolatis, acuminatis, staminum aristis antheris 5-plo longioribus; corollae lobis ca. 13 cm longis.

A glabrous erect shrub 1 to 2 m high, the branches brown or reddish-brown, terete, lenticellate, the branchlets slightly compressed. Leaves elliptical-ovate to oblong-ovate, 8 to 13 cm long, 3 to 6 cm wide, submembranaceous, glabrous, dull or slightly shining, paler beneath, the apex short-acuminate, the base rounded to acute or somewhat acuminate, sometimes slightly inequilateral; nerves 5 or 6 on each side of the midrib, very prominent, anastomosing, the reticulations lax, distinct; petioles 1 cm long or less. Cymes terminal, glabrous, few-flowered, the bracts and calyx lobes lanceolate, long-acuminate, the latter 7 to 9 mm long. Corolla tube white, slightly yellow within, 2 cm long, about 8 mm in diameter, slightly constricted at the middle, enlarged above, the lobes about 8 mm wide at the base, attenuate into long, slender, drooping, yellowish tips, about 13 cm long; appendages about 1 cm long, cleft into two long, slender, acuminate parts. Anthers 3 mm long, sagittate at the base, the filaments very short, somewhat hirsute, the apical awn very slender, about 15 mm long. Ovary glabrous; style cylindrical, about 12 mm long. Follicle woody, oblong-ovoid, about 16 cm long, 7 mm wide; seeds lanceolate, 1.5 to 2 cm long.

PALAWAN, Puerto Princesa, *Merrill 695*, February, 1903; also specimens cultivated in Manila from seeds taken from this specimen, *Merrill 5176*, March, 1906, and *Cuzner*, February, 1908.

This species differs from *Strophanthus cumingii* DC., in its much longer petals and appendages to the anthers and in other characters; it appears to be more closely allied to *S. dichotomus* DC., than to *S. cumingii* DC.

VERBENACEÆ.

CALLICARPA Linn.

Callicarpa surigaensis sp. nov.

Arbor parva, ca. 8 m alta; ramis ramulis inflorescentiis foliisque plus minus dense ferrugineo-stellato-villosis hirsutisque; foliis oblongo-ovatis vel lanceolato-ovatis, caudato-acuminatis, basi acutis, 10 ad 15 cm longis, nervis utrinque ca. 7; cymis axillaribus, pedunculatis, usque ad 4 cm. longis, dense ferrugineo-hirsutis; floribus ca. 5 mm longis.

A small tree, about 8 m high, the branches, branchlets, inflorescence and petioles densely ferruginous-stellate-tomentose and with numerous, long hirsute hairs. Leaves oblong-ovate to lanceolate-ovate, 10 to 15 cm long, 4 to 7 cm wide, subcoriaceous, base acute, apex gradually narrowed into a long, slender, caudate acumen, the upper surface rather densely hirsute on the midrib and nerves, with scattered hairs on the lamina, the lower surface paler, rather densely ferruginous-stellate-villous, and with scattered long hairs on the nerves and midrib; margins minutely denticulate; nerves about 7 on each side of the midrib, prominent beneath, the reticulations distinct; petioles densely hirsute, about 1 cm long. Cymes axillary, penducled, 4 cm long or less, densely ferruginous-hirsute. Flowers red. Calyx about 3 mm long, densely villous, 4-toothed. Corolla glabrous, 5 mm long, 4-lobed, the lobes 2 mm long, obtuse. Stamens 4; filaments subequal, 4 mm long the anthers 2 mm long. Ovary glandular; style 7 mm long; stigma capitate.

MINDANAO, Province of Surigao, *W. B. Allen 168*, July, 1907; *Ahern 318*, May, 1901.

A species well characterized by its dense stellate-tomentose and hirsute, ferruginous indumentum.

Callicarpa ramiflora sp. nov.

Arbor parva, ca. 5 m alta; ramulis petiolisque densissime fulvo- vel ferrugineo-hirsutis; foliis elliptico-ovatis vel oblongo-ellipticis, usque ad 30 cm longis, subtus plus minus stellato-tomentosis; cymis brevibus, congestis, fasciculatis, in ramis vetustioribus; floribus ca. 5 mm longis, calyce plus minus stellato-tomentoso.

A small tree about 5 m high. Branches stout, terete, gray, glabrous, the branchlets densely ferruginous-hirsute. Leaves opposite, elliptical-ovate to oblong-elliptical, 30 cm long and 15 cm wide or less, subcoriaceous, apex short-acuminate, base acute, margins obscurely denticulate, glabrous on the upper surface except the ferruginous-pubescent midrib and nerves, beneath rather densely stellate-tomentose; nerves 12 to 14 on each side of the midrib, prominent beneath, the reticulations very distinct; petioles very densely ferruginous-hirsute, 1 to 2 cm long. Cymes about 1 cm long, fascicled, densely hirsute, congested, in the axils of branches or in the axils of fallen leaves on the older branches. Calyx slightly stellate-villous, 4 mm long, 4-toothed. Corolla 5 mm long, the lobes 4, oblong, obtuse, 2 mm long. Stamens 4; filaments 4 mm long; anthers glandular, 2 mm long. Style 6 mm long; stigma capitate.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1167*, September, 1907, and without number, July, 1907.

A species well characterized by its large leaves, and fascicled, congested, short cymes which are from the branches below the leaves.

Callicarpa basilanensis sp. nov.

Arbor parva, ca. 6 m alta; ramulis petiolisque densissime ferrugineo-hirsutis; foliis oblongo-ovatis vel oblongo-ellipticis, caudato-acuminatis, usque ad 25 cm longis, subtus stellato-tomentosis; cymis 2 ad 2.5 cm longis, fasciculatis, plus minus stellato-tomentosis, e axillis foliorum delapsorum; floribus glabris, ca. 8 mm longis, 4- rariter 5-meris.

A small tree about 6 m high, the branches stout, gray or brownish, glabrous, the branchlets densely ferruginous-hirsute. Leaves opposite, oblong-ovate to elliptical-oblong, 25 cm long and 12 cm wide or less, subcoriaceous, the apex rather slenderly caudate-acuminate, the base acute or rounded, the margins entire, the upper surface hirsute on the midrib and nerves, and more or less papillate-hirsute on the lamina, beneath rather densely stellate-villous and, along the nerves and midrib, somewhat hirsute; nerves 9 to 12 on each side of the midrib, prominent beneath; petioles densely hirsute, 1 to 2 cm long. Cymes 2 to 2.5 cm long, from the axils of fallen leaves, fascicled, more or less stellate-villous. Flowers fragrant, purplish, glabrous. Calyx 3 mm long, 2.5 mm in diameter, 4-toothed. Corolla 7 to 8 mm long, the lobes 4, rarely 5, oblong, obtuse, about 3 mm long. Stamens 4, rarely 5, subequal; filaments 5 mm long; anthers 3 to 3.5 mm long. Stigma obscurely 4-lobed. Pyrenes four, the fruit depressed-globose, 5 mm in diameter.

BASILAN, *For. Bur. 3974, 6124 Hutchinson*, January and July, 1906; *Hallier*, January, 1904.

A species well characterized by its large, acuminate, entire leaves, fascicled cymes from the axils of fallen leaves, and rather large glabrous flowers, which are rarely 5-merous, hence intermediate between *Callicarpa* and *Geunsia*.

RUBIACEÆ.

WENDLANDIA Bartl.

Wendlandia nervosa sp. nov.

Arbuscula 2 m alta; ramulis, subtus foliis, paniculisque hirsutis; foliis subsessilibus, elliptico-ovatis vel oblongo-ellipticis, coriaceis, nitidis, 3 ad 6 cm longis, breviter acuminatis; nervis utrinque 6 ad 8, supra valde impressis, subtus prominentibus; paniculis terminalibus, 3 ad 4 cm longis, congestis, densissime ferrugineo-hirsutis; calycis lobis erectis, 2 mm longis.

A shrub about 2 m high, the branches rather stout, terete, brown, glabrous, the branchlets rather densely brown- or ferruginous-hirsute. Leaves opposite, coriaceous, elliptical-ovate or oblong-elliptical, 3 to 6 cm long, 1.5 to 2.5 cm wide, the upper surface shining, glabrous except the somewhat pubescent midrib, the nerves strongly impressed, the lower surface with scattered short hairs, the midrib and nerves hirsute, the apex shortly acuminate, the base acute or somewhat rounded; nerves 6 to 8 on each side of the midrib, very prominent; petioles stout, densely ferruginous-hirsute, 1 mm long or less; stipules ovate, hirsute, 2 to 3 mm long. Panicles terminal, congested, 3 to 4 cm long, very densely ferruginous-hirsute, the bracts narrowly oblong-lanceolate, hirsute, 4 mm long, the bracteoles similar but smaller. Calyx hirsute, 3 mm long, the tube 1 mm, the lobes narrowly lanceolate, erect, hirsute, 2 mm long. Fruit ovoid, about 2 mm in diameter.

LUZON, Province of Zambales, Mount Tapulao, *Bur. Sci. 5007 Ramos*, December, 1907.

A very characteristic species, readily recognizable by its small, subsessile, very strongly nerved leaves, congested inflorescence, and rather long erect calyx-teeth.

MUSSAENDA Linn.

Mussaenda philippinensis sp. nov.

Arbuscula 1 ad 3 m alta; ramis, ramulis, subtus foliis, paniculisque plus minus hirsutis; foliis membranaceis, oblongo-ellipticis, leviter falcatis, usque ad 25 cm longis, apice acuminatis, basi longe decurrentibus; nervis utrinque ca. 10; calycis segmentibus anguste lanceolatis, hirsutis, 1.5 cm longis, persistentibus, sepala foliacea alba.

A shrub 1 to 3 m high, more or less hirsute. Branches reddish-brown, terete, the younger ones grayish-brown, hirsute. Leaves membranaceous, oblong-elliptical, slightly falcate, 15 to 25 cm long, 6 to 10 cm wide, nearly glabrous above, except the slightly hirsute midrib and nerves, somewhat shining, the lower surface paler, hirsute on the midrib and nerves and with scattered hairs on the lamina, the apex rather strongly acuminate, the base long and narrowly decurrent-acuminate, equilateral; nerves about 10 on each side of the midrib, distinct; petioles 2.5 cm long or less; stipules 1 cm long, ovate, long-acuminate. Panicles terminal, hirsute, the bracts 1.5 to 1.8 cm long, hirsute, cleft into three long, acuminate, narrow segments. Calyx segments persistent, narrowly lanceolate, about 1.5 cm long, 2 to 3 mm wide, with long spreading hairs, one segment sometimes produced, foliaceous, white, its lamina narrowly elliptical-ovate, acuminate, 7 cm long. Corolla-tube slender, yellow, 2.5 cm long, hirsute with long hairs, its lobes ovate, acuminate, about 3 mm long. Fruit obovoid, 1 to 1.5 cm long, when young with few scattered long hairs.

SEMERARA, *Merrill 4139*, July, 1905, common in thickets at about 6 m above sea level.

A species well characterized by its elongated, narrow, persistent calyx-lobes; apparently allied to *Mussaenda wrayii* King, of the Malay Peninsula, but very different from that species.

LASIANTHUS Jack.

Lasianthus everettii sp. nov.

Arbor parva vel arbuscula; ramulis foliis stipulis bracteisque plus minus fusco- vel flavescenti-pilosis vel villosis; foliis lanceolatis vel oblanceolatis, ca. 20 cm longis, longe tenuiter acuminatis, basi acutis; nervis utrinque 9 vel 10; stipulis ovato-lanceolatis, 3 cm longis, dense villosis, longe caudato-acuminatis, submembranaceis; floribus axillaribus, solitariis vel fasciculatis, 5-meris; bracteis anguste lanceolatis, numerosis.

A small tree or shrub, the branches, leaves and stipules more or less densely covered with the rather long brown to yellowish-green hairs, the branchlets nearly black when dry. Leaves lanceolate or oblanceolate, about 20 cm long, 3 to 4.5 cm wide, submembranaceous, the apex long and slenderly acuminate, base acute, both surfaces with numerous long yellowish or brownish hairs; nerves 9 or 10 on each side of the midrib, prominent beneath, curved-ascending, anastomosing, the reticulations lax; petioles 1 cm long, densely villous; stipules prominent, ovate-lanceolate, long and slenderly acuminate, 3 cm long, 8 mm wide, densely yellowish-villous narrowed below towards the base, submembranaceous. Flowers axillary, two or three or more in each axil, sessile, the bracts many, lanceolate, slenderly acuminate, densely villous, about 2 cm long. Fruit about 5 mm long sparingly hirsute, crowned with a tuft of long brown hairs, 5-celled.

NEGROS, near Cadiz Nuevo, *For. Bur. 5591 Everett*, November, 1906.

A very characteristic species, distinguishable by its yellowish hairs, lanceolate long-acuminate leaves and very prominent stipules and bracts which are covered with long yellowish hairs.

RANDIA Houst.

Randia racemosa (Cav.) F.-Vill. Nov. App. (1883) 108; Maxim. in Bull. Acad. Pétersb. **29** (1884) 167; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1888) 382.

Stylocoryna racemosa Cav. Icon. 4 (1797) 45, *t. 368;* DC. Prodr. 4 (1830) 377; Hook. & Arn. Bot. Beech. Voy. (1841) 264; Miq. Fl. Ind. Bat. 2 (1856) 205.

Remijia odorata Blanco Fl. Filip. ed. 2 (1845) 115; ed. 3 1: 205.

Randia densiflora Elm. Leafl. Philip. Bot. 1 (1906) 32; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 130, non (?) Benth.

LUZON, Province of Bataan, Lamao River, *For. Bur. 1472 Ahern's collector; For. Bur. 2047 Borden; Elmer 6873:* Province of Batangas, *For. Bur. 7631, Curran & Merritt*, October, 1907: Province of Pangasinan, *For. Bur. 8390 Curran & Merritt*, December, 1907: Province of Rizal, Bosoboso, *Merrill 2789*, July, 1903; *Bur. Sci. 1054 Ramos*, July, 1906; San Mateo, *For. Bur. 1844, 3166 Ahern's collector*, September, 1904, June, 1905. MINDORO, Pola, *Merrill 2219*, May, 1903. MASBATE, *Merrill 3054*, August, 1903. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1193*, September, 1907.

Widely distributed in the Philippines, and extending to the Riu Kiu Islands.

A species closely allied to and possibly identical with *Randia densiflora* (Wall.) Benth., the type of the genus *Stylocoryna* Cav. (not *Stylocoryne* Wight & Arn.). The transfer to *Randia* is usually credited to Maximowicz, but F.-Villar's combination has priority. The type was from Cavite Province, collected by Née in 1793. The same form was also collected by Haenke, a colleague of Née, specimens of whose exist in the Prague Herbarium and in the Berlin Herbarium, both of which I have examined.

Randia wallichii Hook. f. Fl. Brit. Ind. 3 (1880) 113; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1888) 382; Ceron Cat. Pl. Herb. (1892) 95.

Randia fitzalani Elm. Leafl. Philip. Bot. 1 (1906) 31; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 130, non F.-Muell.

This species was reported from the Philippines by Ceron, l. c., the identification of Vidal's specimen having been made by Rolfe. After an examination of the material representing this species in the Kew Herbarium, I can see no reason for distinguishing the Philippine form from the species described by Hooker f. The Australian *Randia fitzalani* F. Muell., is different, and the Philippine form can not be referred to it. In addition to the numerous specimens from the Province of Bataan, cited by myself l. c., under *Randia fitzalani*, and which must all be referred to *R. wallichii*, I have examined the following specimens:

LUZON, Province of Benguet, Baguio, *Elmer 5927, 5994*, March, 1904: Province of Ilocos Sur, *For. Bur. 5664 Klemme*, November, 1906: Province of Zambales, Subic, *Hallier*, January, 1904; Botolan, *Merrill 2988*, June, 1903: Province of Principe, Baler, *Merrill 1103*, September, 1902: Province of Batangas, *For. Bur. 7635, 7751 Curran & Merritt*, October, November, 1907: Province of Pangasinan, *Bur. Sci. 4834 Ramos*, December, 1907; *For. Bur. 8327 Curran & Merritt*, December, 1907: Province of Rizal, Bosoboso, *Merrill 2632*, June 1903; *For. Bur. 3095 Ahern's collector*, May, 1904.

British India to Yunnan and Java.

UNCARIA Schreb.

Uncaria velutina Havil. in Journ. Linn. Soc. Bot. 33 (1897) 84.

Nauclea canescens Bartl. in DC. Prodr. 4 (1830) 346, non *Uncaria canescens* Korth.

Nauclea clavisepala Elm. Leafl. Philip. Bot. 1 (1908) 350.

LUZON, without locality, *Haenke*, in Herb. Prague: Province of Camarines Sur, *Cuming 1470*: without locality, *Cuming 1503*: Province of Laguna, Los Baños, *Elmer 8262*, April, 1906 (type of *Uncaria clavisepala* Elm.!). MASBATE, *Vidal 2952*.

The type of this species is *Cuming 1503*, given by Haviland through error as no. 503. I have examined the specimens collected by Cuming and Vidal in Herb. Kew, and the specimen collected by Haenke, type of *Nauclea canescens* Bartl., in Herb. Prague, as well as *Elmer 8262*, a specimen of which is in our Herbarium, as is fragment of *Cuming 1503*. Elmer's specimen exactly matches Cuming's, except that the former is in flower and the later in fruit. Haviland states l. c., that he had not seen the type of *Nauclea canescens*, but that judging from the description, it appeared to be the same as *Uncaria velutina*. After an examination of Haenke's specimen I am able to affirm the identity of the two species. Bartling's specific name, although the earliest one, is untenable in *Uncaria* on account of the later use of the same name by Korthals, for a different species.

Endemic.

CUCURBITACEÆ.

GYNOSTEMMA Blume.

Gynostemma elongatum sp. nov.

Foliis pedatim 5-foliolatis; foliolis submembranaceis, integris, glabris, acuminatis, basi acutis inaequilateralibus; floribus albis, dioicis, femineis 8 ad 10 mm longis.

Scandent, glabrous throughout, except the inflorescence. Stems slender, brownish. Leaves pedately 5-foliolate, the petioles 2 cm long, petiolules about 5 mm long; leaflets elliptical-ovate, 4 to 6 cm long, 2 to 3.5 cm wide, submembranaceous, glabrous, entire, base inequilateral, acute, apex short acuminate and sharply apiculate; nerves about 4 on each side of the midrib, distant, curved, reticulations very few; tendrils simple, 10 cm long or more. Panicles about 15 cm long, narrow, the branchlets slightly pubescent. Pistillate flowers white, 8 to 10 mm long, the calyx tube narrowly oblong, densely ferruginous-puberulent, 2 mm thick, the lobes spreading, 1.5 mm long. Corolla rotate, the lobes ovate, acute, 2.5 mm long, veined. Ovary 3-celled; styles 3, free, cleft. Immature fruit oblong, 2 cm long, 4 mm thick, truncate. Staminate flowers not seen.

LUZON, Province of Bataan, near Lamao, *For. Bur. 5474 Curran*, November 23, 1906, climbing on trees in clearings.

A curious species, the leaves nearly identical with those of *Gynostemma integrifoliolum* Cogn., but well characterized by its elongated ovary; possibly a new genus, but difficult to determine this with certainty without staminate flowers and mature fruit.

Gynostemma pedatum Blume Bijdr. (1825) 23; Cogn. in DC. Monog. Phan. 3 (1881) 913.

LUZON, Province of Benguet, Baguio, *Elmer 6033*, March, 1904: Province of Bataan, Lamao River, *Whitford s. n.*, June, 1904. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, November, 1906, and March, 1907.

British India to Japan to Sumatra, Borneo and Java; new to the Philippines.

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SPICILEGIUM FILICUM PHILIPPINENSIUM NOVARUM AUT IMPERFECTE COGNITARUM, II.

By H. CHRIST.
(*Basel, Switzerland.*)

HYMENOPHYLLUM Sm.

Hymenophyllum angulosum sp. nov.

Caespitosum, stipite rhachique inferiore ebeneis exalatis, fronde bi- et ad basin tripinnatifida, fronde sterili late flabellata, fertili elongata, laciniis elongatis divaricato-furcatis, marginibus laevibus integris, soris terminalibus, valvis crenatis, late ovatis.

Habitu *H. capillacei* Roxb., Ins. S. Helenae, et *H. inaequalis* Poir. Africae, sed minus, minusque compositum, laciniis latioribus.

Rhizomate caespitoso-repente filiformi, nigro, glabro uti tota planta, stipite 1.5 ad 3 cm longo stricto tenui ebeneo exalato, fronde sterili subflabellato 3 cm lato et longo, bi-, infrà tripinnatifido, rhachi supra anguste alata nigra, pinnis 3 vel 4 utrinque cuneato-flabellatis, infimis 6-partitis superioribus tripartitis, laciniis ultimis 4 mm longis 1.5 mm latis obtusis linearibus diaphanis nervo nigro praeditis; fronde fertili ovato-oblonga basi attenuata, 7.5 cm longa, 3 cm lata, subtripinnatifida, pinnis 7 utrinque; fronde versus apicem acuminatum sorifera, soris in laciniis terminalibus, 1.5 mm latis, rotundato-ovatis, valvis crenato-denticulatis. Textura tenui, colore dilute fusco-virente.

MINDORO, Mount Halcon, *Merrill 6080*, November, 1906.

Hymenophyllum obtusum Hook. et Arn.; Hook. Sp. Fil. 1:93, *t. 33d.*

LUZON, Province of Benguet, *Elmer 6021*. MINDORO, *Merrill 6087*.

The stations in the Philippines for this species, form a connecting link between southern Africa and the Hawaiian Islands, it having been known from both these places previously; the specimens agree perfectly.

TRICHOMANES Linn.

Trichomanes mindorense sp. nov.

Vicinum T. neilgherrensi Bedd., a quo discrepat venulis spuriis nullis, fronde lateraliter lobata, textura crassiuscula, opaca.

Nanum caespitosum, rhizomate ramoso intricato tenui minuto squamuloso brunneo, foliis confertis numerosis dense caespiticiis, sessilibus, 1.5 cm longis, 2 ad 3 mm latis, aut simplicibus anguste lanceolatis versus basin longe attenuatis obtusis, aut lateraliter et in apice lobatis, lobis 1 ad 4, 1.5 mm longis, rotundato-ovatis obtusis, costa manifesta nigra, nervis obliquis manifestis 6 ad 8 utrinque, simplicibus, ad marginem protensis, nervulis spuriis nullis, margine linea tenuissima cincto. Basi foliorum setulis brunneis vestita, planta aliter nuda. Soris in apice terminalibus omnino immersis subreniformi-dilatatis vix 1 mm latis, ore non prominente angusto, receptaculo interdum longe exserto. Colore brunneo-viridi opaco, textura adiaphana crassiuscula.

MINDORO, Binabay River, *Merrill 6066*, November, 1906.

Trichomanes (Goniocormus) alagense sp. nov.

In genere egregium fronde fere lineari, ad basin solummodo pinnatifida, sed versus apicem in spicam elongatam urceolarum pedunculatarum elegantissime producta. Species minuta caespitosa.

Rhizomate intertexto-filiformi setuloso nigro, foliis approximatis, caespitosis, stipite capillaceo nigro 2 cm longo debili, fronde e basi latiori lineari-lanceolata 3 ad 4 cm longa, basi pinnis 4 aut 5 utrinque confertis cuneato-flabellatis 0.5 cm longis et latis, profunde bipinnatisectis munita, lobis ultimis vix 1 mm latis, ca. 7, obtusis, nervis flabellatim furcatis, in lobis singulis, nigris; fronde versus medium in spicam linearem contracta, rhachi filiformi sed tenuissime alata, urceolis 10 ad 12 pedunculatis alternis campanulatis, pedunculis 2.5 mm longis, inferioribus furcatis, urceolis 1.5 mm longis eleganter campanulatis, margine tenuissimo cinctis, ore dilatato, receptaculo exserto.

MINDORO, Alag River, *Merrill 6062*, November, 1906.

Ab omnibus *Goniocormis* ab Van den Bosch pictis spica terminali discrepans, potius *G. Teysmanni* V. d. Bosch Hym. Jav. *t. 5* comparanda.

Trichomanes flabellatum Van den Bosch Hym. Jav. *t. 12.*

Fronde distincte aristato-ciliata.

LUZON, Province of Laguna, Mount Banajao, *Bur. Sci. 2428 Foxworthy*, March, 1907.

CYATHEA Sm.

Cyathea halconensis sp. nov.

Species uti videtur pumila, alpestris, fronde pinnisque ovatis, rhachi fere ad basin stipitis pinnis reductis brevibus instructa, segmentis serrulatis, soris in furca nervorum positis, minutis, paucis, indusio membranaceo persistente, fronde laevi, stipite inermi, turberculato castaneo.

Stipite brevi, infra pinnarum infimarum insertionem vix 10 cm. longo, basi incrassato, digiti crassitie, squamis destituto, sed verrucoso-tuberculato, castaneo; rhachi rufo-brunnea, tereti, opaca, supra calva, infra tuberculis squamulisque furfuraceis sparsa; fronde tripinnatifida late ovata versus basin sensim attenuata acuminata, 110 cm longa, medio 44 cm lata, pinnis ca. 10 utrinque inter apicem basimque pinnis reductis et rudimentariis instructam, remotis, alternis, breviter petiolatis, ovatis, versus basin attenuatis, acuminatis, 28 cm longis, 10 cm latis, pinnulis ca. 15 utrinque infra apicem pinnae, 6 cm longis, 2 cm latis, sessilibus, acuminatis, confertis, usque ad costam incisis, segmentis ligulatis, 1 cm longis, 2.3 mm latis, ca. 15 utrinque, sinu angusto separatis, subacutis, serrulatis, nervis basi late furcatis, ca. 8 utrinque, fronde laevi, soris parvis, 1 mm latis in furca positis, paucis, saepe binis ad basin segmenti, indusio brunneo membranaceo flaccido persistente; colore obscure viridi, facie inferiore subglauca; textura herbacea.

MINDORO, Mount Halcon, *Merrill 6055*, November, 1906.

Cyathea lanaensis sp. nov.

Stipite brevi, digiti crassitie, sublaevi sed verrucis minutis tuberculatis obsito, rachi cum costis pube furfuracea densa brevi brunnea detergibili vestitis, castaneis, fronde late ovata, versus basin ob pinnas inferiores sensim abbreviatas attenuata, acuminata, 65 cm longa, 45 cm lata, tripinnatisecta; pinnis remotis, mediis 30 cm longis, 8 cm latis, sessilibus oblongis acuminatis apice pinnatifidis; pinnulis 6 cm longis, 12 mm latis, ca. 20 utrinque, confertis, sessilibus, supremis adnatis et decurrentibus, in apicem fere integrum subacutum productis, ad alam 1 mm latam incisis, segmentis confertis, ca. 15 utrinque, sinu acuto separatis, integris, rhombeo-ovatis acutis, 5 mm longis, 3 mm latis, glabratis sublucentibus, nervis prominentibus utrinque 6 a basi furcatis, costa supra et infra rufo-furfuracea, soris costulis adpressis minutis ultra 1 mm latis rotundis rufis, receptaculo globoso magno elevato brunneo, indusio debili mox ad instar patenae corrugatae fere hyalinae sorum circumdante et evanido; textura papyracea, colore saturate viridi.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, November, 1906.

ASPIDIUM Sw.

Aspidium subconfluens Bedd. Handb. 214.

MINDORO, Binabay River, *Merrill 5870*, November, 1906.

An additional continental species to the mountain flora of the Philippines.

Aspidium Menyanthidis Presl Reliq. Haenk. 1: 28.

LUZON, Province of Pampanga, Mount Abu, *Bur. Sci. 4906 Foxworthy*.

The specimens agree with those from Finschhafen, New Guinea, coll. *Weinland*, July, 1890, even to the immersed sori.

NEPHROLEPIS Schott.

Nephrolepis Clementis sp. nov.

Rhizomate ignoto; stipite 4 ad 9 cm longo, tereti, 1 mm crasso, cum *rhachi straminea* dense squamulis ochraceis peltato-ovatis *tecto*; *frondo* 25 ad 40 cm longa, 4 cm lata elongato-caudata et fere indefinite crescente i. d. pinnulis novellis imbricatis involutisque ferace; pinnis numerosissimis confertis sessilibus basi ovato-hastatis, inferioribus sterilibus rotundato-obtusis, 2 cm longis, vix 1 cm latis; fertilibus superioribus lanceolatis, 2.5 cm longis, 0.5 cm latis, acutiusculis, costa tenui sed manifesta media, nervis confertissimis numerosissimis obliquis, soris marginalibus nec prominentibus ca. 15 utrinque, 1 mm diametro, rotundis, indusio peltato-reniformi aspidioideo; faciebus laevibus, facie superiore ad insertionem sororum hinc inde punctis calcareis notata; textura subcoriacea, pinnis articulatis et deciduis, colore ochraceo-viridi opaco.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 920*, January, 1907.

Between *Nephrolepis cordifolia* Presl and *N. volubilis* J. Sm. with a semi-indefinite growth of the leaf. Pinnae obtuse, very numerous, sori marginal, aspidioid, rachis chaffy.

HUMATA Cav.

Humata repens (L.) Diels, var. **minuscula** var. nov.

Var. aut subspec., a typo discrepans foliis minutis, 2.5 cm longis, 2 cm latis, stipite brevi (2 ad 3 cm) tenui, lamina fertili a sterili haud diversa, breviter et late lobata; plantula omnino habitu *H. parvulae*, excepta fronde fertili angustisecta hujus speciei.

LUZON, Province of Rizal, *Bur. Sci. 1815 Ramos*, January, 1907.

MICROLEPIA Presl.

Microlepia todayensis sp. nov.

Amplissima, quadripinnatifida, stipitibus fasciculatis succulentis 100 ad 150 cm longis, fronde 150 cm longa ovata; rhachi 1 cm et ultra crassa, rufo-straminea, lucente, furfuraceo-pilosa; pinnis circ. 70 cm longis, 23 cm latis, oblongis acuminatis versus basin aliquantum angustatis; costa costulisque ochraceis pilosulis, pinnis inferioribus remotis, superioribus magis confertis, alternis, ca. 25 utrinque, breviter petiolatis, basi anteriore auctis, trigono-oblongis acuminatis, mediis 12 cm longis, basi 4.5 cm latis, pinnulis ca. 14-jugatis, infimis petiolulatis, reliquis subsessilibus nec adnatis nec decurrentibus, basi anteriore auriculate auctis, infimis anterioribus 3 cm longis, basi ad costulam, caeterum usque ad alam plus minus angustam incisis, versus apicem lobatis, lanceolato-oblongis confertis, acutiusculis, lobis ultimis ovato-oblongis obtusis subintegris, 3 ad 4 mm longis, nervis manifestis subtus prominentibus, in lobis furcato-pinnatis, obliquis, subtus pilis longis omnino obsitis, soris impressis, minutis, raris, ad basin loborum plane intramarginalibus, saepius mediis, dilute brunneis, rotundis, pilis longis circumdatis, indusio fugaci rotundato griseo infero; facie superiore obscure virente subnitente, pilis raris albidis sparsa, inferiore opaca pilosa; textura tenuiter chartacea.

MINDANAO, District of Davao, Todaya, *Copeland 1480*, October, 1904, alt. 1,200 m.

Very large and very hairy beneath, the sori minute, not marginal but rather medial, immersed; frond quadripinnate, pinnae and segments very regular. It has the habit of *Microlepia Speluncae* (L.) Moore, but the frond is more papyraceous, shining and rather glabrous on the upper surface, the veins prominent beneath: stipes clustered. *Microlepia hirta* Kaulf. differs in its broader pinnae and segments, the latter less regular, thicker and more cuneate.

ATHYRIUM Roth.

Athyrium Loheri Christ in Bull. Herb. Boiss. II 6 (1906) 1001.

Haec species delicatula valde peculiaris, indusio fere aspidioideo praedita, a cl. Lohero in Luzon detecta, etiam provenit in Ins. Mindoro.

MINDORO, Bulalacao, *Bur. Sci. 1529 Bermejos*, August–September, 1906.

Totius Archipelago unitas quoad floram mirum in modum praesentia talium specierum endemicarum in pluribus insulis illustratur.

Athyrium halconense sp. nov.

Ecce novum membrum gregis quam in honorem P. Fauriei nominavi: equidem novum elementum Sinico-Japonicum in flora Philippinensi. A reliquis speciebus hujus gregis differt pinnis numerosioribus obtusis valde auriculatis et profundius incisis. Indusium subaspidioideum.

Rhizomate crasso suberecto radicoso, foliis fasciculatis, stipite 6 ad 9 cm longo viridi aut brunneo rigido, squamis subulato-lanceolatis 3 mm longis pellucidis brunneis vestito, lamina 20 cm longa, 4.5 cm lata, oblonga acuminata ad basin vix attenuata, pinnata, pinnis patentibus confertis petiolulatis ca 30 utrinque, oblongo-rhombeis, 2.5 cm longis, 0.5 cm latis, basi inaequalibus, postice cuneatis, antice valde auriculatis obtusis, utrinque, sed magis antice, lobato-incisis, lobis cum auricula 7 aut 8 utrinque, 2 mm latis, ovatis acutiusculis, nervis valde obliquis, furcatis, nigris, soris ramo anteriore impositis, uno pro lobo, magnis ultra 1 mm latis, indusio manifesto et persistente griseo-brunneo rotundato-reniformi, tenui, integro; fronde laevi; textura herbacea, colore laete virente.

MINDORO, Mount Halcon, *Merrill 6092, 6097*, November, 1906.

DIPLAZIUM Sw.

Diplazium deltoideum Presl Tent. 114.

Asplenium deltoideum Presl Rel. Haenk. 1: 47, *t.* 7.

Species fronde longe stipitata deltoidea, pinnis paucis elongatis, profunde partitis, lobis crenatis angustis, soris regularibus aequilongis rectis saepe diplazioideis; textura rigide chartacea; rhizomate obliquo et breviter repente crasso lignoso nigro radicoso, foliis solitariis aut subfasciculatis, stipite stramineo aut plumbeo-fusco, basi nigro 20 ad 40 cm longo rigido, fronde longiore; fronde deltoidea 25 ad 27 cm longa et fere aequilata, bipinnata, pinnis paucis, 5 vel 6 utrinque infra apicem subito et longe productum pinnatifidum; pinnis infimis breviter petiolatis, caeteris sessilibus, infimis basi attenuatis, usque ad 16 cm longis, 4 cm latis, usque ad alam angustam et basi usque ad costam incisis; segmentis lanceolato-ligulatis, ca. 20 utrinque, sinu angusto separatis, 1 ad 2 cm longis, 3 ad 5 cm latis, obtusis, subintegris aut crenatis, nervis 7 vel 8 utrinque, furcatis; soris 7 vel 8 in furca anteriore sitis obliquis aequalibus rectis a costa ad marginem protensis, 2 ad 3 mm longis, linearibus, saepe duplicatis, indusio angusto revoluto brunneo; colore laete virente.

LUZON, Province of Rizal, *Bur. Sci. 1799, 1802 Ramos*, January, 1907. MINDANAO, Mount Batangan, *Warburg 14126*.

HYPOLEPIS Bernh.

Hypolepis tenerifrons sp. nov.

Haec species alpestris, habitu Dryopteris vilis (Kunze) Javae, certe generi Hypolepidi adnumeranda est, quocum omnino congruit, etsi sori exindusiati submarginalesque sint, quod inter Hypolepides minime inusitatum, teste H. punctata (Polypodio, Thunb.) Rhizoma nostrae plantae aliquantum dissimile caeteris speciebus quia non longe repens, sed potius obliquum, subrepens, stipitesque plus minus fasciculatos emittens, sed in plantis novellis caeterarum Hypolepidium etiam vernatio fasciculata occurrit.

Rhizomate elongato obliquo subrepente, pinnae anserinae crassitie; foliis paucis fasciculatis; stipitibus versus basin incrassatis, pennae corvinae crassitie, angulosis sulcatis, 25 cm longis, stramineis, squamis lanceolatis 4 mm longis, acuminatis, flaccidis dilute brunneis, minoribus subulatis intermixtis vestitis, rhachi tenui flava squamulosa; fronde deltoideo-ovata acuminato-elongata, basi vix attenuata, 40 cm longa, basi 30 cm lata, tripinnata; pinnis ca. 25 utrinque, sessilibus, oppositis, inferioribus remotis 9 cm distantibus, supremis approximatis, inferioribus mediisque 17 cm longis, 6 cm latis, basi vix attenuatis ovato-lanceolatis caudato-acuminatis, costa tenui; pinnulis recte-patentibus ca. 20 utrinque, approximatis, ovato-lanceolatis, 3 cm longis, 1 cm latis, acutis, ad costam partitis, segmentis tertii ordinis ligulato-lanceolatis, ca. 10 utrinque, inferioribus liberis, obtusis, 0.5 cm longis, 2.5 mm latis, inciso-dentatis, dentibus ovatis acutis 3 aut 4 utrinque, soris numerosis, in segmentis tertii ordinis singulis ad basin anteriorem submarginalibus, sed indusio marginali carentibus, rotundis, fere 1 mm latis, flavo-brunneis; rhachi costisque, partimque facie folii puberulis, textura flaccide et diaphane herbacea; colore dilute virente.

MINDORO, Mount Halcon, *Merrill 6103*, November, 1906. MINDANAO, Mount Apo, *Copeland 1462*, October, 1904.

PAESIA St. Hilaire.

Paesia luzonica sp. nov.

Cum speciminibus Neocaledonicis Paesiae rugulosae (Labill.) quas cl. C. Moore et nuper cl. Bonati l. Franc debeo, plantam Luzonicam a cl. Lohero 1897 et iterum 1906 in monte Data et monte Banajao Luzoniae lectam denuo accuratius comparavi, et discrimina satis gravia reperi.

P. Luzonica differt statura minore, rhachi valde flexuosa, fulvo-straminea, indumento tuberculis fulvis verruculosis nec non pilis flexuosis albidis constituto, pinnis remotis elongatis flexuosis, usque ad 18 cm longis, caudato-protractis, et segmentis ultimi ordinis sterilibus 5 mm longis anguste cuneatis profunde laciniatis, lobulis lineari-lanceolatis acutis; fertilibus 5 mm longis, mucronatis. P. rugulosa differt statura majore, rhachi fere recta castanea, indumento pilis rufis transverse plicatis aut striatis setulisque minimis opacis constituto, pinnis confertis trigono-ovatis, rectis, 10 cm longis, acuminatis; segmentis ultimi ordinis sterilibus 0.5 mm longis, inaequaliter ovatis obtusis crenatis, lobulis abruptis brevissimis, fertilibus 2.5 mm longis obtusis.

VITTARIA J. Sm.

Vittaria elongata Sw., var. **alpina** var. nov.

A typo differt foliis brevioribus, 20 ad 25 cm longis, 11 mm latis, magis caespitosis, versus apicem solummodo soriferis.

MINDORO, Mount Halcon, *Merrill 5859*, November, 1906.

ELAPHOGLOSSUM Schott.

Elaphoglossum Merrillii sp. nov.

Ab E. conformis formis margine distincto membranaceo, laminam coriaceo-suberosam cingente, punctis minimis pilosis per faciem inferiorem dispersis, et coma squamarum linearium brunnearum rhizoma coronante valde diversum.

Rhizomate (obliquo ?) coma squamarum subulatarum 1 cm longarum ciliatarum tecto, folii sterilis stipite 8 cm longo, plano usque ad basin alato, 0.5 cm lato, lamina obovata obtusa, 20 cm longa, 5.5 cm lata (costa, rufa plana 2.5 mm lata), nervis occultis patentibus simplicibus ad marginem protensis haud clavatis, margine membrana tenui pallida 0.6 mm lata cincta, textura suberoso-coriacea, facie inferiore numerosis punctis minimis pilosis sparsa, superiore laevi, colore ochraceo-virente. Folio fertili omnino simili sed minore et acutiusculo, margine membranaceo egregie reflexo, sporangiis dilute brunneis costam non tegentibus.

MINDORO, Mount Halcon, *Merrill 5853*, November, 1906.

AZOLLA Lam.

Azolla africana Desv.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, March, 1907, with *Lemna trisulca* Linn.

MARSILEA Linn.

Marsilea Mearnsii sp. nov.

Semiaquatica aut terrestris, rhizomate longe et late repente ramoso, 1 mm crasso, nudo brunneo, radicoso, foliis fasciculato-caespitosis, numerosis, stipitibus 8 ad 10 cm longis tenuibus flaccidis nudis uti foliola, sed ad basin coma tomentosa ochracea circumdatis, lamina quadrifaria, foliolis 1.5 cm longis et fere aequilatis, cuneato-trigonis, angulis obtusis, latere exteriore denticulatis, dentibus brevibus triangularibis 5 ad 8, lamina spuriis nervis translucidis experte; sporotheciis numerosis glomeratis, e rhizomate ad foliorum basin oriundis, stipitibus solitariis, stipite 0.5 ad 1.5 cm longo, rigido, tereti, rufo-ochraceo, pilis ochraceis tomentello, sporotheciis ovato-rotundatis, horizontalibus, ad stipitem manifeste lateraliter adnatis, 3 mm longis, atro-brunneis, tomento griseo sparsis; colore plantae laete virente, textura herbacea.

LUZON, Province of Ilocos Norte, *Bur. Sci. 2317 Mearns*, January, 1907.

Belonging to the essentially African group with single adnate conceptacles.

FERNS OF SOUTHERN CHINA.

By Edwin Bingham Copeland.
(From the Bureau of Education, Manila, P. I.)

During the past year I have received three collections of Chinese ferns sent for determination. The first was from Rev. H. A. Kemp, an American missionary at Choochowfu, near Swatow. These ferns were collected at Mr. Kemp's request in Kwangtung Province, about 180 miles northeast of Hongkong. The second collection was sent by Dr. Charles G. Matthew of the British Navy. Dr. Matthew collected them in the mountainous interior of Kwangtung and Fokien Provinces. The third was from Mr. S. T. Dunn, Director of the Hongkong Botanic Garden. Mr. Dunn collected these ferns in 1905 in Fokien Province. These gentlemen have my cordial thanks for honoring me with the opportunity to determine their collections.

The fern flora of this part of China has been described from various earlier collections sufficiently so that it is no longer worth while to enumerate all the ferns found now. I therefore mention here only the species to which some especial interest attaches.

Dryopteris sparsa (Ham.) O. K.

There are a number of specimens of this common and variable fern, and they vary from typical to plants (*Dunn 3884*) I can not distinguish from the Japanese *D. Sabaei* (Franch. et Sav.) C. Chr., which Christ, Bull. Herb. Boiss. (1899) 822, has already reported from China, referring it however to *D. Filix-mas*. There are also depauperate specimens, the most extreme of which, *Dunn 3836*, from Tan Ka Cha, alt. 1,200 m, I can not distinguish by description from *D. Cavalerii* (Christ) C. Chr.

Dryopteris erythrosora (Eaton) O. K.

Dunn 3832 and *3874* are coriaceous plants with very scaly stipe and rachis suggesting the form mentioned by Christ from the collection of Cavaler, Ac. Geog. Bot. (1904) 117, but not aristate. They might be referred to *D. lacera* except that the frond is soriferous throughout. And they are not very distinct from forms of the protean *D. Filix-mas* (*Aspidium Championi* Benth., *Dunn 3881*).

Dryopteris Eatoni (Baker) O. K.?

Matthew 4 from Tai Mo Shan, alt. 730 m, agrees with the description, except that it is glabrous beneath and more dissected. It has not been reported before from the mainland.

Dryopteris decipiens (Hook.) O. K.

Matthew 56, Samsa. Fokien: *Kemp*.

Dryopteris sp.

Dunn 3810 is a quadripinnatifid plant, the rachises clothed with fine reddish-gray chaff, hitherto unknown to me.

Dryopteris cuspidata (Bl.) Christ var. **epigea** Copel. var. nov.

Rhizomate paleacco epigeo, late repente, ramoso, fronde non prolifera, nec aliter typo Blumeano diversa.

Matthew 1, Tai Mo Shan. "In marshy ground by stream. Rhizome creeping, above ground."

Polystichum aristatum (Forst.) Presl.

Dunn 3878 is quadripinnate, and differs from the fine-cut Philippine plants of this group in having almost glabrous stramineous rachises.

Dictyocline Griffithii Moore.

Dunn 3759, 3761, simple, deeply lobed fronds: *Kemp*, a sterile frond with five pairs of free pinnæ.

Dictyocline is certainly entitled to stand as a genus, characterized even better by its venation than by the hemionitidoid fructification.

Lindsaya orbiculata (Lam.) J. Sm.

Mr. Kemp's collection includes both the round-leaved form, and the large and acute *L. javanensis* Bl.

Athyrium (Diplazium) nudicaule Copel. sp. nov.

Planta tota, teste Matthew, fere 2 m alta: rhizomate ca. 1 cm crasso, horizontale, nigro, fere nudo, squamis minimis nigris ad apicem vestito: stipite 5 mm crasso, ad pedem subaspero, atro; fronde tripinnatifida, acuminata, rhachi viride; pinnis alternantibus, patentibus, acuminatis, majoribus 50 cm longis; pinnulis subsessilibus, acuminatis, majoribus 11 cm longis, 4 cm latis, rhachin versus truncatis, glabris, supra atroviridibus, infra olivaceis, papyraceo-coriaceis, in lobos rotundatos 9 mm latos obscure serrulatos subcontingentes ⅔ ad costam incisis; venis liberis; soris brevibus a costa vix ad mediam laminam protensis, inferioribus curvis; indusio angusto, mox desiccante.

Kwangtung Prov., China, *Matthew 33*, 1907.

A species of the *D. maximum* group, recognizable by the dark color, short and relatively broad pinnules set close together, short sori, and especially, having complete material, by the nakedness of the slender stipes and prostrate rhizome. With Milde, I treat *Diplazium* as a group or at most a subgenus of *Athyrium*.

Athyrium (Diplazium) Matthewi Copel n. sp.

Rhizomate ignoto, verisimiliter erecto: stipite 35 cm alto, atro, fere glabro; fronde 60 cm alta, ca. 30 cm lata, subbipinnata, apice breve pinnatifida, glabra, herbacea, infra pallida; rhachi obscuro, glabro; pinnis alternantibus, utroque latere ca. 8, majoribus 17 cm longis, 7 cm latis, acutis, pedicellatis, infimis paullo brevioribus, supremis more A. maximi lobatis, majoribus subpinnatis; segmentis basalibus ovatis acutis, 16 mm latis, abrupte semitruncatis, adnatis, integris vel subcrenatis; soris regularibus, parallelis, costam, nec marginem, attingentibus, diplazioideis;

segmentis sequentibus adnato-coalescentibus, triangulari-ovatis; venulis liberis, infimarum ramulis ad sinum protensis.

Tai Mo Shan, S. China. 300 m. s. m. *Matthew 6*, 1907.

A species of the *D. maximum* group, well characterized by the very large and almost or quite entire segments and uniform, parallel sori of most of the frond. The small pinnæ below the apex are in fructification as well as in form like those of *D. maximum*.

Athyrium opacum (Don) Copel. comb. nov.

Hemionitis opaca Don Prod. Fl. Nepal. 1825.

Matthew 38, on wet bowlders along streams. Kwangtung Province.

This is already reported from China by Christ, Ac. Geog. Bot. (1906) 242; with the appropriate comment "Cette plante est un *Diplazium* pur sang, mais à indusie nul, comme du reste il y en a plusieurs."

Athyrium decurrenti-alatum (Hooker) Copel. comb. nov.

Gymnogramme decurrenti-alata Hooker Sp. Fil. 142, *Plate 294*.

Dunn 3839, Lin Fa Shan, in stream, alt. 850 m.

Hitherto known from Japan. This fern suggested *Diplazium* to Hooker, but devotion to formal characters has up to this time prevented its being placed with its evident relatives.

Athyrium chlorophyllum (Baker) Copel. comb. nov.

Asplenium chlorophyllum Baker, Journ. of Bot. (1885) 104.

Kemp: Matthew 46, Tai Mo Shan, alt. 760 m.

Known from Formosa and Penang, but not hitherto reported from China.

Athyrium zeylanicum (Hook.) Milde.

Dunn 3860, Yenping.

Fée figures this species with a dilated sinus, which is wanting in Mr. Dunn's plants, and states that the annulus is composed of 20 cells, while of these it has 15 to 17: otherwise they are identical. *A. zeylanicum* is already known only from the interior of Ceylon. The discovery of this similar or identical plant at such a distance, but still in the range of *Athyrium lanceum* (Thunb.) Milde, suggests a close affinity of both pinnatifid plants and the entire one.

Asplenium unilaterale Lam.

Dunn 3843, the common Japanese form.

Asplenium obscurum Bl. (*A serraeforme* Mett.)

A form with very short sori, as figured by Mettenius, Asplenium, *Plate IV f. 13*, and pinnæ acute, less cut away than in Mettenius' figure or in Javan specimens. As in Javan specimens, the indusium often ruptures instead of separating from the frond at the "free" edge.

Matthew 34, Kwangtung Prov., the roots in water.

Hitherto known only from Java.

Asplenium davallioides Hooker.

Dunn 3861, 3925a. These specimens are not as finely cut as those from Japan and Korea.

Asplenium Bodinieri Christ.

Matthew 37, Kwangtung. Dr. Christ has kindly compared this with the type from Kouy Cheou.

Asplenium Wrightii Eaton.

Dunn 3841, Lin Fa Shan.

Already known from Japan and China. Mr. Dunn's plant is sharply serrate, but not lobed. I have also an otherwise typical Japanese specimen which is not lobed; and Christ reports from Swatow a merely dentate form (Ac. Geog. Bot. (1906) 243.)

Asplenium adnatum Copel. sp. nov.

Rhizomate suberecto, 5 mm crasso; stipitibus confertis, 10–15 cm altis, nigro-castaneis, paleis 5 mm longis angustissimis subdeciduis sparse vestitis; fronde 15–20 cm alta, ca. 3 cm lata, pinnata; rhachi supra viride unilineata, infra deorsum ut stipite; pinnis oblongis horizontalibus vel superioribus adscendentibus, rotundatis, apices versus obscure dentatis, late adnatis sed plerisque rhachin versus angustatis, (infimis aequalibus subdistantibus exceptis) ala connexis, supremis coadunatis, coriaceis, supra glabris, infra pallidis puberulis; venis subflabellatis, inconspicuis; soris paucis, longis, obliquis.

Tai Mo Shan, S. China, 800 m. s. m. inter saxa granitica. *Matthew 3.*

A member of the group of *A. crinicaule* Hance, well characterized by the adnate, and throughout the most of the frond coalescing, very obtuse pinnæ.

Woodwardia Kempii Copel. sp. nov.

Species Woodwardiae Harlandi affinis, fronde sterile ignota, fertile 20 cm alta, 15 cm lata, bipinnatifida, subcoriacea, glabra; segmentis$^{\mathrm{I}}$ infimis liberis vel sequentibus ala angusta connexis, subfalcatis late oblanceolatis; segmentis$^{\mathrm{II}}$ infimis utroque latere reductis et remotis, supra mediam partem segmenti primae ordinis maximis, usque ad 3 cm longis, ca. 5 mm latis, falcatis sinu exsculpto separatis, apicem versus serrulatis; venulis laxe anastomosantibus: soris et ad rhachidem alatam frondis, et ad costas segmentorum$^{\mathrm{I}}$ inter ramum et ramum continuis, et ad costas segmentorum$^{\mathrm{II}}$ interruptis fere ad apicem attingentibus.

Kwangtung, *Kemp.*

Distinguished from *W. Harlandi* by the long-lobed segments, and the row of sori practically the whole length of the rachis. Mr. Kemp's collection includes also *W. japonica* (L. f.) Smith, and *W. orientalis* var. *prolifera*, hitherto known from Formosa, the Riu Kiu, and Batanes Islands.

Adiantum Capillus-Veneris L.

Dr. Matthew's collection contains three ferns very distinct in appearance, and none typical *A. Capillus Veneris*, but all for the present more safely referred here than held separate. No. 23 is a shallowly cut form, smaller than *A. refractum* Christ. No. 21 is a large specimen of the deeply cut form "B" of *Species Filicum*. No. 22 is a large form, the stipe 30 cm and the lamina 40 cm long, which tallies with Vaccari's Italian "*forma giganteum.*"

Plagiogyria adnata (Bl.) Bedd.

Dunn 3936 is a form with broad, short segments, with sinuses dilated and of about the usual width, the stipe and rachis 4-angled. The species is known in China only from Yunnan and Kouy Cheou and the identification of this is not positive.

Plagiogyria tenuifolia Copel. sp. nov.

Stipitibus frondis sterilis 15 cm fertilis 25 cm altis rhachibusque glabris brunneo-stramineis, acute trigonis; fronde sterile oblonga, 16–20 cm longa, 8–9 cm lata, vix ad rhachidem in pinnulis adnatis partita; pinnulis medialibus 4–4.5 cm longis, 8 mm latis, acutis, apicem versus grosse obtuse serratis, sinubus angustis interpositis, pinnulis inferioribus paullo reductis, infimis valde deflexis, glabris, herbaceis; fronde fertile ca. 10 cm alta, pinnis utrinque ca. 12, 2–2.5 cm longis, inferioribus stipitatis, rhachidem versus haud hastatis; annulis non interruptis.

Ma On Shan, 450 m. s. m. *Matthew 51.*

A species of the *adnata* group, recognizable by the moderately reduced lower pinnæ and thin, rather soft, lamina. *P. adnata* of Java (*teste* Blume), and the Philippines, has a four-cornered stipe and rachis, but the plant so called by Beddome is said to have them triangular in section. A single fertile frond sent by Mr. Kemp may be this species. It has 14 pairs of pinnæ, many of which are unequally decurrent on their pedicels.

Plagiogyria Dunnii Copel. sp. nov.

Stipite frondis sterilis 20–25 cm alto glabro, ad basin aerophoris paucis donato, brunneo-bialato, rhachideque acute carinatis; fronde 40 cm alta, 10 cm lata, acuminata, fere ad rhachidem pinnatifida; pinnis medialibus 5 cm longis, 5 mm latis, plerumque rectis, acuminatis, apices versus serrulatis, glabris, tenuibus, sinubus latitudine pinnas saepe superantibus separatis, inferioribus plus minus diminutis, paullo deflexis, supracurrentibus; fronde fertile 25 cm alta, pinnis pede sterile adnatis, utroque latere plusquam 35, infra mediam frondem 5 cm longis sursum sensim decrescentibus.

Ad montem Yenping, 900 m. s. m. *Dunn 3934.*

Another species of the *adnata* group, recognizable by its thin, soft fronds, and narrow, widely separated pinnæ, the lowest moderately reduced, the sharply keeled rachis, and the adnate sterile bases of the fertile pinnules. *P. Henryi*, the only species unknown to me, is said to have the stipe and costa convex beneath, the segments broader, and the lowest abruptly reduced to auricles.

Pellaea nitidula (Wall.) Baker.

Matthew 28, Kwangtung Prov.: *Dunn 3917*, Fokien Prov., Ye Shap To, deep gorge, alt. 600 m.

This fern has much the appearance of a *Doryopteris.* It was collected in Yunnan by Delavay.

Cheilanthes Fordii Baker.

Fokien Prov., *Dunn 3925.*

This species was described by Baker from Canton, and so far as I know has never been reported elsewhere. I have the same plant from Formosa, determined as *C. mysurensis* Wall., and the two are certainly very alike. My *C. Boltoni* of Mindanao may also be too near it, but so far as the single collection shows is more slender, with less cut pinnules, and a more pronounced pale-brown, double wing on the rachis. *C. Fordii* was put into the subgenus *Adiantopsis* by Baker, and is called *A. Fordii* by Christensen. *C. Fordii*, *C. mysurensis*, and *C. Boltoni* belong together; but I do not believe that they and *Adiantopsis radiata* have a common immediate origin, in *Cheilanthes* or elsewhere.

Pteris nana Christ in Christensen Index Fil. 603, var. **quinquefoliata** Copel. var. nov.

A typo statura majore, pinnis lateralibus ad baseos fissis differt.

S. China. *Matthew 18*, 1907.

Twice the size of Christ's plant, and thus differing from it in the direction of the parent species, *P. cretica*, from which the species remains easily distinguishable. One dwarf frond is trifoliolate, and one large one has a simple intermediate pinna on one side.

Pteris insignis Mett.
Matthew 5, Tai Mo Shan, 700 m alt.

Pteris decrescens Christ Ac. Geog. Bot. (1906) 244.
Matthew 19, Kwangtung Prov. Described from Kouy Cheou.

Pteris grevilleana Wall.
Matthew 55. Fokien Prov., apparently a rare fern in China.

Pteris dimorpha Copel. sp. nov.

Rhizomate adscendente 4 mm crasso, radices permultas emittente, paleis minutis castaneis apice coronato; stipitibus deorsum rubidis, sursum stramineis, supremo anguste alatis, frondis sterilis 12–15 cm, fertilis 20–25 cm altis; fronde sterile tripartita, glabra, papyracea, laete viride; pinnis lateralibus ovatis, falcatis, profunde incisis; segmentis utroque ca. 5, proximis, oblongis, obtusis, argute serratis, segmento basale non libero nec non iterum lobato; pinna impare 12–15 cm alta, late lanceolata, sensim acuminata, segmentis utroque latere ca. 10, inframedialibus maximis, inferioribus reductis, ad insertionem pinnarum parium decurrentibus; fronde fertile 10–15 cm alta, more P. creticae pinnata, pinnis utroque 2, inferiore fissa altera simplice, 6 mm latis, decurrentibus; indusio angusto, continuo, atro-griseo.

Kwangtung Prov., China, ad ripas. *Matthew 20*.

A very striking species, whose sterile fronds look like miniature *P. tripartita*, while the fertile suggests *P. ensiformis* and *P. heteromorpha*. The dimorphism extends even to the groundplan of the fronds.

Vittaria caricina Christ.
Kemp. Kwangtung Prov. Known only from the original collection in Kouy Cheou.

Vittaria filipes Christ Ac. Geog. Bot. (1907) 150.
Matthew 8, *Dunn 3762*, both from Fokien Province. Dr. Christ has kindly compared Dr. Matthew's fern with the type. Both of these collections contain forked fronds. Dr. Matthew notes that the fronds shrunk by one-third in drying.

Vittaria flexuosa Fée, or near it.
Matthew 49, Tai Mo Shan, 750 m alt. The fronds are 5 mm wide. This species was described from India: its range is uncertain.

Polypodium niponicum Mett.
Dunn 3815. This species was originally described from immature specimens and the diagnosis very exactly fits young fronds in this collection.

Polypodium maculosum Christ.

Dunn 3812. Fokien Province.

Described from Yunnan. Mr. Dunn's plants agree with the published description, except that the spots on the upper surface opposite the sori, which give the species its name, are not, in these specimens, really conspicuous.

Polypodium trabeculatum Copel. sp. nov.

Rhizomate repente, 3 mm crasso, paleis nigris peltatis apiculatis argute dentatis 2–3 mm longis dense vestito; stipitibus 1–2.5 cm altis, validis, nigris vel sursum viridescentibus; lamina 12–18 cm alta, sicca vix ultra 2 cm lata, margine integro, viva fere duplo latiore, margine crispo, utrinque sensim angustata, acuta; paleis nigris minutis peltatis orbicularibus vel saepius caudato-ovatis utroque latere satis numerosis; planta viva carnoso-coriacea, venis principalibus nullis, venulis inclusis irregularibus, sicca lignosa, venatione omnino occulta; hypodermate hyalino nullo, cellulis palisadiformibus trabeculato-incrassatis; soris in seriem unam apud costam instructis, globosis, 4 mm latis, vix immersis, a paleis cinctis, paraphysibus aliter paucis, supra pallido-cinctis.

Kwangtung Prov., China, ad arbores muscosos. *Matthew 31.*

A species of the *P. lineare* group, best marked by the large costal sori and very black paleæ on all parts of the plant: these are characteristically toothed by the black excurrent walls. The numerous thickened lines on the palisade parenchyma walls, running perpendicularly to the surface, prevent any great collapse in that direction with loss of water; but the lateral shrinkage is such as I have never seen approached by any other fern. There is also a shortening of about 15 per cent. The stomata are superficial. Dr. Christ, to whom I sent a specimen, does not regard this as safely separable from *P. lineare* Thunb., but it seems to me sufficiently easily distinguishable by other characters, if the scales on the frond be ignored.

Polypodium hastatum Thunb.

Dunn 3815. The commonest form, hardly at all hastate; but peculiar in being decidedly glaucous.

Dunn 3808. Hastate-tripartite: peculiar in its almost membranaceous lamina.

Polypodium macrophyllum (Bl.) Reinw.

Matthew 44, Kwangtung Prov. Typical plants.

Dunn 3895. The margin crisped, and the largest frond abruptly contracted at the base of the lamina proper, approaching the following.

Polypodium macrophyllum (Bl.) Reinw. var. **fokienense** Copel. var. nov.

Foliae lamina propria basi valde hastata, rarius pinnatifida, deinde ad stipitem decurrente.

Dunn 3757, Fokien. I am not positive that this is not *Selliguea cochlearis* Christ Ac. Geog. Bot. (1907) 142.

Polypodium Pteropus Bl.

Kemp s. n. The trifid, dark-green form, with sori all elongate along the veins, not too certainly identical with the Javan plant.

Cyclophorus assimilis (Baker) C. Chr.

Matthew 30. Kwangtung Prov., on limestone. Known only from China.

Elaphoglossum sp.

Matthew 7 and *Dunn 3821* are plants without adult fertile fronds, and Mr. Kemp sent a single fertile frond, without sterile. The identification of an *Elaphoglossum* from this region would be very interesting, but it is impossible without more complete material.

Osmunda banksiaefolia (Presl) Kuhn.

Dunn 3765. Teeth less oblique than in the type, which is Philippine. *O. javanica* is a very distinct plant.

Osmunda cinnamomea L.

Dunn 3763. Decidedly unlike the American plant. Already known from Yunnan and Manchuria.

Angiopteris sp.

Dunn 3769. Very distinct from real *A. evecta* Hoffm. and from any species hitherto reported from China. *Venulae recurrentes* none, sori mostly 10-16-locular, submarginal, pinnules at most 6 cm long.

A REVISION OF THE PHILIPPINE SPECIES OF ATHYRIUM

By Edwin Bingham Copeland.
(*From the Bureau of Education, Manila, P. I.*)

On the basis of the most thorough anatomical study the group has received, Milde[1] many years ago declared the distinctness of *Athyrium* from *Asplenium*, the close affinity of the former to *Dryopteris*, and the impropriety of the generic separation of *Athyrium* and *Diplazium*. Diels in Naturlichen Pflanzenfamilien, and Christensen, in his Index Filicum, have agreed with Milde in limiting *Asplenium*, but no one seems to have followed him in merging both *Diplazium* and *Anisogonium* in *Athyrium*. In work on the Philippine ferns it has become perfectly evident that each of these two genera, *Athyrium* and *Diplazium*, as usually construed, contains some members with herbaceous or subfleshy fronds, tawny or brown paleæ, and exclusively fibrous roots, and others with characteristic, comparatively harsh fronds, almost black, harsh paleæ, and stout black roots; and that each of these groups is more nearly related to the corresponding group in the other "genus" than to the other group of its own "genus." In other words, *Athyrium* being obviously the more primitive, *Diplazium* has had a double or plural origin in it.[2]

Athyrium silvaticum (Bl.) Milde is closely related to the dominant group in *Diplazium*, in spite of the form of its sori. *Diplazium japonicum* (Thunb.) and its relatives on the other hand are intimately related to *Athyrium* in the usual sense, more so than to the main *Diplazium* group; one of the so-called *Diplazia* in this group is *A. grammitoides* (Presl), which Milde recognized as *Euathyrium*.

So long as intimate affinity and the difficulty of definition were the only grounds offered for combining these two genera, there was some opportunity for play of judgment, and for the continued maintainance of *Diplazium* as a valid genus. But once it is recognized that *Diplazium* has had a plural origin in *Athyrium*, I can imagine no sufficient ground for continuing to treat the former as of generic rank. The line between them could possibly be redrawn so that the Philippine species, at least, would form natural groups; but they would not be readily enough distinguishable to constitute convenient genera. I therefore prefer, with Milde, to regard all the species of both as *Athyria*.

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[1] Das Genus Athyrium. *Bot. Zeit.* 24 (1866) 373-376. Ueber Athyrium, Asplenium und Verwandte. *Bot. Zeit.* 28 (1870) 329, 345, 370.

[2] Comparative Ecology of San Ramon Polypodiaceae, *This Journal* 2 (1907) *Bot.* 63. Pteridophyta Halconensia, ibidem, pp. 127, 128.

For similar reasons it is impracticable to group the species with anastomosing veins in a genus by themselves (as *Anisogonium*), for *Anisogonium cordifolium* and the other species with practically entire pinnæ may, but more probably do not, have a common ancestry; while *A. decussatum* and *A. esculentum* certainly had two other distinct lines of free-veined ancestors. Therefore, a natural classification of *Athyrium, sensu latiore*, will not maintain the old genera, with their usually accepted limits, as subgenera.

In general, the stout, harsh species constitute a comparatively recognizable group, which may still be called *Diplazium*, as a minor group, since most of its members have borne that name, and since the type of the genus *Diplazium* is in this group, if in either. However, it is my personal opinion that this group is a biologic rather than an altogether natural one, and that several of the groups of "*Diplazia*" have originated separately in *Euathyrium*. *A. umbrosum, A. silvaticum, A. sorsogonense, A. nigripes, A. cyatheaefolium*, and *A. Whitfordi* may well all have originated independently of each other in *Euathyrium;* and each has its own relatives or descendants in *Diplazium*. Likewise, the more delicate species, including most of the plants commonly called *Athyrium*, and the type of the genus, may be designated as *Euathyria*. *Diplazium* is a tropical group, while it is to the north of the Philippines that *Euathyrium* reaches its greatest development in species.

Although as natural as a large and primitive genus well can be, *Athyrium* is practically indefinable. The *Asplenieae* as a whole are naturally and conveniently distinguished from the *Aspidieae* by the elongate sori. These are found practically without exception in the other genera, and in most of the species of this one. But of late there have been included in *Athyrium*, a number of species the sori of which seem to have been handed down unchanged from ancestors anterior to the separation of the two tribes, and other species are included which have apparently inherited the subelongate and unstable sori which must have preceded the fixing of the *Athyrium* type. The typical sorus of *Euathyrium* is intermediate between that of *Dryopteris* and those of *Diplazium* and *Asplenium*. Nature offers us no character and no group of characters by which we can certainly distinguish the primitive *Athyria* from their near relatives in *Dryopteris*. If we try to make the line between the genera a natural one, we must decide the critical cases on their individual merits, according to their probable affinity to recognized members of either genus; and such characters as pubescence, texture, or margin, in general valueless as generic characters, may decide our judgment as to the affinity of single species. If they be classified arbitrarily by the sori, some species apparently related to other *Athyria*, but without known equally near relatives in *Dryopteris*, will fall unnaturally in the latter genus. Also I have recently ascribed to *Dryopteris*, as *D. dubia*,[3] a fern the most of whose sori are athyrioid; the reason being that it seemed more closely related to certain unmistakable species of *Dryopteris* than to any *Athyrium*, and it is apparently as near to *Acrophorus* as to either of these genera.

Milde's anatomical criteria seem to serve almost perfectly for the distinction of *Athyrium* from *Asplenium*. The difference in sorus form is convenient, but, by itself, an unreliable criterion. As a matter of fact, the *Diplazia* with asplenioid sori always betray their true nature to the naked eye by characteristics of form, and of color and texture of the fronds, roots, and paleæ. The other derivatives of *Athyrium* are easily distinguished by obvious and familiar characters.

ATHYRIUM Roth.

The central and most primitive genus of *Asplenieae*, typically distinguished from *Dryopteris* and other primitive *Polypodiaceae* by having an elongate, indusiate sorus, and the critical primitive *Athyria* having usually finely cut and non-deltoid fronds; distinguished from *Asplenium* by having paleæ with thin lateral walls and pigment in the lumen, by having in the base of the stipe two vascular bundles which unite above to form a peripheral horse-shoe-shaped one, and by usually having some or all of the sori curved across the vein or occupying both sides of it; distinguished from *Diplaziopsis* by the rupturing indusium of the latter and its combination of thin lamina and anastomosing veins; and from *Blechnum* by having the sori on veins which run directly or obliquely toward the margin.

There are known to me more than fifty Philippine species, all terrestrial; but several of these, apparently undescribed, are not taken up in this paper.

[3] Elmer's Leaflets, 1 (1907) 235.

KEY TO THE PHILIPPINE SPECIES

- Frond thin and herbaceous or subfleshy paleæ thin, usually pale roots not coarse and black
  - Sori all or many dryopteroid
    - Frond less than 15 cm high including stipe — 1 *hyalostegium*
    - Frond taller stipes clustered
      - Frond deltoid — 2 *Loheri*
      - Frond not deltoid — 7 *haloonense*
  - Sori elongate straight curved or double
    - Rhizome long creeping margin mostly entire
      - Frond lanceolate oblong pinnæ incised — 3 *japonicum*
      - Frond lanceolate only the lowest pinnæ incised
        - Paleæ of stipe 5 mm long — 5 *acrotis*
        - Paleæ shorter — 4 *grammitoides*
    - Fronds clustered margins toothed
      - Pinnæ cut to a winged rachis — 8 *anisopterum*
      - Bipinnate pinnules cuneiform — 32 *geophilum*
      - Bipinnate pinnules round ovate merely toothed — 10 *philippinense*
      - Pinnules almost or quite pinnate
        - Ultimate divisions small and narrow — 9 *aristulatum*
        - Ultimate divisions broad and ample — 14 *stramineum*
- Frond harsh sori dryopteroid — 6 *drepanopteron*
- Frond herbaceous paleæ brown roots dark and rigid
  - Indusium none — 13 *Elmeri*
  - Indusium present — 11 *brevipinnulum*
- Frond membranaceous paleæ and roots black sori not costular — 26 *meyenianum*
- Frond herbaceous paleæ and roots black sori costular — 12 *nigripes*
- Frond harsh papyraceous or coriaceous paleæ and roots usually black sori elongate
  - Frond tripinnate or pinnules cut ¾ to the midrib
    - Ultimate segments inciso crenate — 19 *silvaticum*
    - Ultimate segments entire or serrate
      - Segments about 5 mm wide — 15 *platyphyllum*
      - Segments narrow
        - Stipe spiny pinnæ many — 20 *Blumei*
        - Stipe smooth pinnæ few
          - Segments sharply toothed — 17 *atratum*
          - Segments almost entire
            - Pinnæ opposite — 18 *oligosorum*
            - Pinnæ alternate — 19 *silvaticum*
  - Frond bipinnate veins free
    - Lobes of pinnules broad lowest sori long curved
      - Pinnules very acuminate, sori remote from margin — 24 *davaoense*
      - Pinnules acuminate sori nearing margin — 22 *dolichosorum*
      - Pinnules obtuse all rachises scaly — 23 *pestitium*
    - Lobes narrow sori not very long nor curved
      - Stipe and rachis aculeate — 21 *fructuosum*
      - Stipe and rachis not spiny
        - Pinnules not very oblique

- Pinnules or segments strongly falcate 16 *ebenum*
- Pinnules or segments not strongly falcate
  - Rachis of pinnæ winged only near apex 17 *atratum*
  - Free pinnules few 16 *cyatheaefolium*
- Pinnules very oblique short sharply cut 12 *nigripes*
- Frond bipinnate veins anastomosing 25 *esculentum*
- Fronds almost bipinnate
  - Pinnæ approximately equal sided at base
    - Sori costular reaching hardly ⅓ to margin 28 *brachysoroides*
    - Sori reaching more than half way to margin
      - Frond broadly triangular 29 *deltoideum*
      - Lowest pinnæ not elongate 27 *sorsogonense*
  - Pinnæ oblique at base
    - Moderately oblique
      - Pinnæ more than 4 cm long 30 *Whitfordi*
      - Pinnæ less than 3 cm long 33 *Williamsi*
    - Pinnæ strongly auricled above 31 *Bolsteri*
- Fronds pinnate pinnæ cut but not beyond the middle
  - Veins free
    - Pinnæ not over 2 cm long 33 *Williamsi*
    - Pinnæ 2 5 4 cm long obtuse 36 *crenato serratum*
    - Pinnæ more than 6 cm long acute 34 *pinnatum*
  - Veins anastomosing 39 *accedens*
- Fronds pinnate pinnæ entire or serrate
  - Frond pinnatifid at apex
    - Pinnæ ovate falcate 35 *cultratum*
    - Pinnæ narrower straight
      - Indusium conspicuous 36 *crenato serratum*
      - Indusium inconspicuous 37 *inconspicuum*
  - Apical pinna like the lateral
    - Veins free
      - Pinnæ lanceolate truncate at base 38 *pallidum*
      - Pinnæ lanceolate cuneate serrate 40 *palauanense*
      - Pinnæ very broadly lanceolate entire 41 *fraxinifolium*
      - Pinnæ ovate stipitate 43 *tabacinum*
    - Veins anastomosing
      - Pinnæ ovate or frond simple and cordate
        - Pinnæ usually about 10 pairs 44 *pariens*
        - Pinnæ few or frond simple 45 *cordifolium*
      - Pinnæ broadly lanceolate
        - Rachis stramineous naked 41 *fraxinifolium*
        - Rachis ebeneous chaffy 42 *Cumingii*
- Fronds pinnatifid 46 *Merrillii*

DRYOPTEROID SPECIES

1 **A hyalostegium** Copel in Philip Journ Sci 1 (1906) Suppl 253

Mount Mariveles alt 1 350 m *Copeland 2033 Merrill 5166* Zambales Prov, *For Bur 8214 Curran & Merritt*

2 **A Loheri** Christ in Bull Herb Boiss II 6 (1906) 1001

(Montalban Rizal Prov *Loher**) Bulalacao Mindoro, *Bur Sci 1529 Bermejos* det by Dr Christ

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* Specimens cited in parenthesis were not seen by me

The greatly enlarged lowest pair of pinnæ and the strong development of the basiscopic pinnules of this pair are unique in *Athyrium*, and strongly suggest that the plant is really a *Dryopteris*.

GROUP OF A. JAPONICUM.

3. **A. japonicum** (Thunb.) Copel. comb. nova. *Asplenium japonicum* Thunberg Fl. Jap. (1784) 334; *Diplazium*, Beddome; *Athyrium Copelandi* Christ in Philip. Journ. Sci. 2 (1907) Bot. 161.

Batanes Islands, *Bur. Sci. 3812 Fenix;* Babuyan, *Bur. Sci. 3899 Fenix;* Mount Data, *Copeland 1909;* Mount San Cristobal, Laguna, *Copeland s. n.:* Mindoro, *Merrill 5920.*

Japan to India.

Even though construed fairly narrowly, excluding such forms as *Diplazium Petersenii*, this is still a decidedly variable fern, and I can not, judging from the single collection of *A. Copelandi*, see sufficient differences to justify holding it distinct.

4. **Athyrium grammitoides** (Presl) Milde. *Diplazium grammitoides* Presl Epim. (1849) 84. *Asplenium brachypodum* Baker, Syn. Fil. (1874) 490. *Asplenium toppingianum* Copel. in Perkins Fragmenta (1905) 184. *Athyrium nanum* Christ in Philip. Journ. Sci. 2 Bot. (1907) 161.

"Philippines" *Cuming 56:* Balilao, Bontoc, *Copeland 1896;* Benguet, *Topping 194, 284, 309, Elmer 5787, 6285, Copeland 1801, Bur. Sci. 2872 Mearns;* Mount Mariveles, *Copeland 2041;* Cavite Province, *Bur. Sci. 1309 Mangubat;* Mount Maquiling, *Copeland s. n.;* Tayabas, *Elmer 8041:* Mindoro, *Merrill 5921:* Mount Canlaon, Negros, *Copeland 2077:* Lanao district, Mindanao, *Clemens 656, 1125a;* Zamboanga, *Copeland 1491a;* Mount Apo, *Copeland 1491, Williams 2519.*

A decidedly variable little species, but, as I here construe it, clearly distinct from all others known to me except *A. japonicum*. Forms are rarely found which seem as near the latter as to *A. grammitoides*. *A. Toppingii* is what I now believe to be typical *grammitoides*. The variety *mistum* is a form occasionally found wherever the species is, and not entitled to consideration as a stable variety.

One of our sheets of *Cuming's No. 56* is entirely *A. grammitoides*, but the other contains also an immature plant which may be *A. Williamsi*. Judging from Baker's description I think he may have had the mixture before him, but his diagnosis applies most nearly to small specimens of *A. grammitoides*. *A. nanum* is described as a dwarf, such as is occasionally found in various places; but the type collection of *A. nanum*, *Clemens 656*, includes also the typical form and the still large *mistum*.

5. **Diplazium Acrotis** Christ in Bull. Herb. Boiss. II. 6 (1906) 1000.

Dr. Christ distinguishes this little fern from *A. grammitoides* by the absence of a wing on the almost filiform rachis, very regular pinnæ, each with a sharp rectangular auricle, and paleæ 5 mm long on the stipe.

GROUP OF A. FILIX-FOEMINA.

6. **Athyrium drepanopteron** (Kze.) Moore.

Benguet, *Topping 237, 249, 333, Pond s. n., Elmer 6498, Copeland 1800, Boyce s. n., For. Bur. 5090 Curran, Bur. Sci. 2754, 3435, 3436, 3519, 4191, 4515, 4521, 4533 Mearns.*

Japan to northern India.

GROUP OF A. MACROCARPUM.

7. **A. halconense** Christ in Philip. Journ. Sci. 3 Bot. (1908) 273.

Mount Halcon, Mindoro, *Merrill 6092, 6097.*

A relative of *A. macrocarpum* (Bl.) Bedd.

8. **Athyrium anisopteron** Christ in Ann. Acad. Mans. 1907; Philip. Journ. Sci. 2 (1907) Bot. 160. *Aspidium Fauriei* var. *elatius* Christ Bull. Herb. Boiss. II 6 (1898) 193. *Nephrodium*, Copel. Polypodiaceæ (1905) 21.

Benguet (*Loher*), *Copeland 1967, Bur. Sci. 4188* (a dwarf or immature form) *4189, 4190 Mearns;* Zambales, *For. Bur. 8217 Curran & Merritt.* Perhaps related to *A. drepanopteron, Mearns 4190* (a dwarf) approaching the latter by having unusually long and sharp pinnæ. On another side it approaches *A. macrocarpum* (Bl.) Bedd.

GROUP OF A. NIGRIPES.

9. **Athyrium aristulatum** Copel. in Philip. Journ. Sci. 1 (1906) Suppl. 253.

Mount Data, Lepanto, Luzon, *Copeland 1880;* Benguet, *Mearns 4192,* same place, *Mearns 4193,* a very tall, lax form.

A. aristulatum var. **sphagnicolum** Copel. ibidem.

Mount Data, *Copeland 1871.* A dwarfed form in a sphagnum bog.

10. **Athyrium philippinense** Christ in Philip. Journ. Sci. 1 (1906) Suppl. 254. *A. Sarasinorum* Christ var. *philippinense* Christ in Bull. Herb. Boiss. II 6 (1898) 154.

Mount Data, Luzon, (*Loher*), *Copeland 1909a.*

A near relative of *A. brevipinnulum*, which in turn is unmistakably related to *A. nigripes.*

11. **Athyrium brevipinnulum** Copeland sp. nova.

Athyrium A. nigripedi affine, paleis crinitis, pinnis sessilibus, pinnulis brevibus latis non decurrentibus distinctum.

Rhizomate adscendente radices atras rigidas emittente basibusque stipitum paleis angustis brunneis crinitis vestitis; stipite 15–25 cm alto rhachideque stramineis: fronde 25–30 cm alta, ca. 15 cm lata, glabra; pinnis sessilibus horizontalibus, utroque latere ca. 12, infimis quam sequentibus vix majoribus, rhachidibus solummodo apud apicem anguste alatis: pinnulis utroque latere pinnarum majorum ca. 13, trapezoideis, cuneato-auriculatis, ca. 11 mm longis 7 mm latis, breviter inciso-serratis, obtusis vel subacutis, herbaceis: soris ca. 2 mm longis, costalibus, plerisque asplenioideis.

In mossy forest, alt. 2,200 m. Mount Bulusan, Benguet, Luzon, *Copeland 1939.*

12. **Athyrium nigripes** (Bl.) Moore, var. **mearnsianum** Copel. var. nova.

Caudice basibusque stipitum paleis fere nigris vestitis, soris ca. 2.5 mm longis, pinnulis acute dentato-serratis.

This is a very variable fern common in Benguet and the neighboring highland. Some specimens seem too distinct possibly to be *A. nigripes;* but others, which seem unmistakably the same plant, agree for the most part with Blume's diagnosis and with some Javan specimens. As construed by Raciborski this is a very variable species in Java also. Some Benguet specimens have the lowest pinnæ moderately reduced. Notable points of agreement between plants of Java

and Benguet are the teeth cleft at the apex, and the wing, decurrent from the lowest acroscopic pinnule, which occupies the angle between the main rachis and that of a pinna.

Benguet, *Elmer 6543, Copeland 1943, Bur. Sci. 4184 Mearns;* Mount Data, *Copeland 1877.*

13. **Athyrium Elmeri** Copel. sp. nova.

Affine A. opaco (Don) Copel., quo stipite subviride, rhachidibus viridibus, fronde multo minore, graciliore, pinnulis obtusis, segmentis integris, sinubus apertis differt.

Rhizomate suberecto radices rigidas grisco-atras emittente, paleis fuscis lanceolatis coronato: stipite ca. 20 cm alto; apud basin paleaceo; fronde 30–40 cm alta, 15–20 cm lata, tripinnatifida, membranacea, glabra, pinnis acuminatis, infimis sequentibus aequalibus vel paullo diminutis; pinnulis infimis brevistipitatis, sequentibus anguste adnatis, majoribus ultra mediam laminam incisis, apices versus fere integris; soris brevibus, irregularibus, prope costam pinnulae; indusio nullo.

On mossy waterworn rocks in ravines, Horn of Negros Mountain, altitude 1,200 m, May, 1908, *Elmer 10168.*

14. **Athyrium stramineum** Copeland sp. nova.

Athyrium gregis A. nigripedis, rhachide sicco sorisque perpallidis, lamina membranacea nigra distinctum.

Radicibus rigidis ut videtur carentibus; stipite 30 cm alto ad basin paleis brunneis paucis vestito, aliter glabro, vivo succulente, rhachideque viridibus; fronde 50 cm alta, 20 cm lata; pinnis pinnatis utroque latere ca. 8, stipitatis, majoribus 15 cm longis, 5 cm latis, acuminatis, infimis paullo reductis suberectis; pinnulis subobliquis, 25 mm longis, 14 mm latis, obtusis, fere ad costam incisis, medialibus anguste adnatis, distalibus decurrentibus, tenuissime membranaceis, infra saturate viridibus, supra fere nigris; segmentis oblongis, denticulatis; soris usque ad 3 mm longis, oblongis, costalibus, sparsis, indusiis angustis virido-albis fere omnibus asplenioideis; sporangiis pallide brunneis.

Damp fertile soil, altitude 750 m, Horn of Negros Mountain, April, 1908, *Elmer 9703.*

15. **Athyrium platyphyllum** Copeland sp. nova.

Species distinctissima gregis A. nigripedis, pinnulis majoribus symmetricis amplis, pinnis longe stipitatis.

Rhizomate ut videtur horizontale, 1 cm crasso, radices nigras rigidas emittente, apice basique nigra stipitis paleis fusco-nigris angustis 6 mm longis vestitis; stipite 25–50 cm alto, fere glabro rhachidibusque stramineis; fronde grande fere 60 cm alta, 40 cm lata, subdeltoidea, acuminata, tripinnatifida; pinnis 45°–60° distantibus, acuminatis, pedicellis pinnarum infimarum usque ad 4 cm longis; pinnulis plerumque angulo recto distantibus pedicellatis sed superioribus adnatis et supremis coadunatis, majoribus 7 cm longis, ultra 2 cm latis, basin versus fere ad costam lobatis; segmentis usque ad 5 mm latis, subfalcatis, sinu aperto

separatis, integris vel ad apicem paucidentatis, glabris, subcoriaceis; soris margine remotis, usque ad 3 mm longis, diplazioideis et asplenioideis, indusiis persistentibus.

Mount Data, Luzon, alt. 2,200 m, *Copeland s. n.*, *Copeland 1868:* Pauai, Benguet, alt. 2,100 m, *Bur. Sci. 4185, 4186, 4187 Mearns.*

Near this and possibly to be included, are *Bur. Sci. 5120 Ramos* from Zambales, and *Bur. For. 4642 Mearns & Hutchinson*, from Mount Malindang, Mindanao. The former suggests *A. cyatheaefolium* in its form, but it belongs rather in this group.

GROUP OF A. CYATHEAEFOLIUM.

16. **A. cyatheaefolium** (Rich.) Milde. *Asplenium*, (Bory) Rich., Sert. Astrol. (1834) 19; *Diplazium*, Presl, Epim. 88. *Diplazium ebenum* J. Sm., but *not D. caudatum* J. Sm., which is *A. meyenianum.*

Luzon, *Cuming 158* (in some sets, *159*); Mount Banajao, *Whitford 1014*, *Elmer 8078*, *Robinson s. n.:* San Ramon, Mindanao, *Copeland* 1669; Lanao district, *Mrs. Clemens.*

New Guinea and beyond.

Asplenium cyatheaefolium was originally a New Guinea fern (Cf. Presl l. c.), but is more generally known from Cuming's Luzon collection. A specimen received by the Bureau of Science from the British Museum bears the statement on the label that this, here numbered 158, is 159 of Smith's herbarium. It is No. 158 in the herbarium of the N. Y. Bot. Garden. Not having access to New Guinea specimens nor the original publication, I have construed *A. cyatheaefolium* as the British botanists have done, but am not sure to what fern Mettenius applied this name. The ferns I am including here are not identical, those from Luzon having a dark, more or less pubescent stipe and rachis, while those from San Ramon have the axes paler and glabrous.

17. **A. atratum** (Christ) Copel. comb. nova. *Diplazium atratum* Christ in Philip. Journ. Sci. 2 (1907) Bot. 163.

Palawan, *Bur. Sci. 714, 683, 663 Foxworthy:* Zambales, *Bur. Sci. 5127 Ramos.*

Ramos' plant is reddish in cast, and further lightened in color by the copious, more or less confluent sori. Still it is certainly this species, as shown by the pubescent axes, and the rachises of the pinnæ, characteristically arched just above their insertion.

18. **Athyrium oligosorum** Copel. comb. nova. *Diplazium oligosorum* Copel. in Philip. Journ. Sci. 2 (1907) Bot. 128.

Mount Halcon, Mindoro, *Merrill 5913: Bur. Sci. 2740 Mearns* from Benguet, and *Elmer 9991* from Negros are very near this.

GROUP OF A. SILVATICUM.

19. **Athyrium silvaticum** (Bl.) Milde, 1866. *Allantodia*, Bl. Enum. (1828) 173. *Brachysorus woodwardioides* Presl Epim. (1849) 70, *Asplenium*, Baker, Copel. in Polypodiaceæ, 87. *Athyrium basilare* Fée.

Luzon, *Cuming 153*; Mount Banajao, *Bur. Sci. 2410 Foxworthy:* Mindanao, San Ramon, *Copeland 1493a;* Mount Apo, *Copeland 1493*, *Williams 2298.*

Celebes, Java.

Foxworthy's specimen and Cuming's are altogether alike, but the Luzon plant is not fully identical with those from farther south. The caudex of the Mindanao specimens cited here is more or less erect, and may reach a height of 60 cm.

20. **Athyrium Blumei** (Bergsm.) Copel. comb. nova. *Asplenium Blumei* Bergsm. 1857, Mett. *Asplenium* No. 224. *Diplazium polypodioides* Bl.; *Athyrium*, Milde 1870, non Schur. 1858. *D. marginatum* Bl. 1828, non Diels 1899 which is *Athyrium marginatum* Milde. *Asplenium diplazioides* Bory 1833, non H. & A., 1832. *Allantodia aspidioides* De Vr. 1851, non *Athyrium*, Presl 1836.

Luzon, *Cuming 20, 288* in part; Nueva Viscaya, *Merrill 233*; Tarlac, *Hall s. n.;* Mount Arayat, *Bolster 72;* Mount Mariveles, *For. Bur. 132 Barnes*, *Copeland 235*, *For. Bur. 1238 Borden, Topping 365, 398, Whitford 194, Elmer 6709;* Rizal Province, *Bur. Sci. 4583, 4646 Ramos;* Cavite Province, *Bur. Sci. 1296, 1329 Mangubat;* Mount Mayon, *Bur. Sci. 2018 Mearns:* Negros, Gimagaan River, *Whitford 1637;* Mount Canlaon, *Copeland s. n.;* Horn of Negros, *Elmer 9869, 10245:* Mindanao, Lanao district, *Mrs. Clemens s. n.;* Zamboanga, *Copeland 1663;* Mount Apo, *Copeland 1492.*

India to Australia.

This is a fern of such size that a fragment of the frond can not be determined with certainty, and descriptions which do not include the caudex nor even the stipe are quite insufficient. In listing synonyms I have merely followed Christensen, and do not suppose that if the entire plants were known all of these names would be found to apply to one species. As to the name I have chosen, there is nothing in the diagnosis to show that it differs from any specimen I have listed, it is regarded by Christensen as a synonym of *D. polypodioides*, and is the oldest name available in *Athyrium*. Neither do I regard all the Philippine plants provisionally called by this name as being conspecific; but since descriptions are inadequate and the many specimens at my disposal from India and Malaya are likewise incomplete, the best that can be done is to make this for the present a "*Sammelspecies.*" *Diplazium asperum* Bl. (*Athyrium*, Milde) is still another species, which, for the reasons just given, I can not determine positively. I have several specimens from Java, pieces of fruiting fronds, which I can in no way distinguish from young specimens of *A. Blumei;* but having no doubt as to the correctness of Blume's judgment, I have not combined the species.

Athyrium asperum (Bl.) Milde, just discussed, is also reported from the Philippines. We have here, in fact, two ferns which will fit Blume's diagnosis, one with a stout stipe and one with a slender stipe. Old and densely fruiting fronds of either are practically indistinguishable from the preceding species. Raciborski, Pteridophyten der Flora von Buitenzorg, 227–8, reduces *asperum* to *polypodiodes*. The Mindoro plant, *Merrill 5918*, which I referred to *D. asperum*, Philip. Journ. Sci. 2 (1907) Bot. 129, does not exactly fit Blume's diagnosis, and can not nearly be included in Raciborski's description.

21. **Athyrium fructuosum** Copel. comb. nova. *Diplazium fructuosum* Copel. in Philip. Journ. Sci. 1 (1906) Suppl. 150. *Diplazium affine* J. Sm. 1841, *nomen nudum; Athyrium*, Milde.

San Ramon, Zamboanga, *Copeland 1699:* Luzon, *Cuming 167.*

This differs typically from *A. asperum* in that the pinnules are not at all cuneate, and the sori in fully fruiting specimens are confluent. Near this, but hardly identical is *Elmer 10006*, from Horn of Negros Mountain.

I should of course have taken up Milde's name if I had suspected the identity of *A. affine;* but it is only as this paper is being finished, two years after the publication of *D. fructuosum*, that I receive one of the lower pinnules of *Cuming 167*, which seems to be the same fern. We already had a fine specimen of the upper end of a frond of this fern, but in this group of species it is often impossible to identify such parts.

22. **Athyrium dolichosorum** Copel. comb. nova. *Diplazium dolichosorum* Copel. Philip. Journ. Sci. 1 (1906) Suppl. 151. *D. Smithianum* Christ ibid. 2 (1907) Bot. 163, but not, I believe, of Diels.

Luzon, *Cuming 170;* Rizal, *Merrill 2667, Bur. Sci. 956 Ramos;* Mount Maquiling, *Loher:* Negros, Mount Canlaon, *Copeland 2071;* Horn of Negros, *Elmer 9958:* Bohol, *Cuming 349* in part: Mindanao, San Ramon, *Copeland 1716, Williams 2293.*

This is distinguished from **Athyrium maximum** (Don) Copel. (*Asplenium maximum* Don, Prod. Fl. Nepal. (1825) 8), by the aculeate stipe and more or less aculeate rachis. *Diplazium Smithianum* is described by both Baker and Beddome as having anastomosing veins. Some of the specimens cited above are *assumed* to have spiny stipes.

23. **Athyrium vestitum** (Presl) Milde.

Samar, *Cuming 336.*

Recognizable by its short broad pinnules as well as by the pubescent rachises.

24. **Athyrium davaoense** Copel. comb. nova. *Diplazium davaoense* Copel. in Philip. Journ. Sci. 1 (1906) Suppl. 151.

Mount Apo, *Copeland s. n.*

25. **Athyrium esculentum** (Retz.) Copel. comb. nova. *Hemionitis esculenta* Retz. Obs. Bot. 6 (1791) 38.

Luzon, *Cuming 35;* Benguet, *Topping 166, 210, For. Bur. 5071 Curran;* Nueva Ecija, *Merrill 280;* Pampanga, *Topping 478;* Manila, *Zamora 3;* Lamao River, *Merrill 2542, 2552, Williams 139, Elmer 6682;* Rizal Province, *Bur. Sci. 87 Foxworthy, Bur. Sci. 1797 Ramos;* Los Baños, *Elmer 8052;* Tayabas, *Gregory 60:* Mindoro, *For. Bur. 11010, 11022 Merritt:* Negros, *Elmer 10115:* Mindanao, Lanao, *Clemens 106* (a very narrow form); San Ramon, *Copeland 1690;* Davao, *Copeland 604, Williams 2821.*

India to Polynesia.

GROUP OF A. UMBROSUM.

26. **Athyrium meyenianum** (Presl) Milde. *Diplazium,* Presl Epim. 88. *Diplazium caudatum* J. Sm. *Asplenium deltoideum* Hooker, Sp. Fil. 3:255, non Presl q. v. infra. *D. melanopodium* Fée Mém. 8:85. *A. cyatheæfolium* Moore, *non supra.*

Luzon, *Cuming 29, 159, 288* in part; Rizal Province, *Bur. Sci. 1090, 4582 Ramos;* Mount Maquiling, *Matthew s. n.:* Mindoro, *McGregor 141:* NEGROS, *Elmer 9626, 10010:* Mindanao, Lanao, *Clemens 111;* Zamboanga district, *Copeland 734, 1573, Merrill 5463;* Davao, *Copeland 966* (?). *Bolster 129,* from Cagayan Province, Luzon, is an immature plant, which is this species or a new one near it.

While I am convinced that this fern is not *D. deltoideum* I am by no means so confident that it is *D. meyenianum;* if not, it should be known by Fée's appropriate name. The description of *D. meyenianum* contains nothing which does not fit this fern unless it be the texture, but it is very incomplete. The plant I have is a most distinct one, characterized by thin texture, conspicuous, sparse sori usually as near the margin as to the midrib, lowest veinlets in most specimens sterile, but in occasional specimens all fertile and the lowest sori then usually diplazioid, the bases of the rachises of the pinnæ usually black, and the base of the stipe bearing copious acicular black paleæ, unlike those of any other species. The pinnules are strikingly suggestive of the pinnæ of *A. sorsogonense.* The caudex is more or less erect.

Although very distinct from any other *Athyrium,* this species is within itself very variable, and may ultimately prove to include several.

GROUP OF A. SORSOGONENSE.

27. **Athyrium sorsogonense** (Presl) Milde. *Diplazium Woodii* Copel. Philip. Journ. Sci. 2 (1907) Bot. 129.

(Luzon, Sorsogon, *Haenke*): Mindoro, *Merrill 5917* (*D. Woodii*): Leyte, *Cuming 301*: Negros, *Elmer 10392*: Mindanao, *Copeland 1775*.

India, Malaya.

I described *D. Woodii* as distinct because of its unlikeness to my Mindanao specimen; but *Elmer's* Negros plant is intermediate, and *Cuming's* from Leyte, which I have but lately received, is almost exactly like the Mindoro specimens.

28. **Athyrium brachysoroides** Copel. comb. nova. *Diplazium brachysoroides* Copel. Philip. Journ. Sci. 2 (1907) Bot. 127.

Mindoro, *Merrill 5919*.

Intermediate between *A. cyatheæfolium* and *A. sorsogonense*.

GROUP OF A. WILLIAMSI.

29. **Athyrium deltoideum** (Presl) Milde. *Asplenium*, Presl Rel. Haenk. 1 (1825) 47, *Tab. 7, f. 2*, non Hooker.

(Luzon, *Haenke*): Rizal Province, *Bur. Sci. 1799, 1802 Ramos*.

These specimens fit Presl's figure so exactly, and the form of the frond is so characteristic that I can not doubt their specific identity. Small fronds have even the lowest pinnæ not quite pinnate. The rhizome is oblique, and the base of the stipe black, clothed when young with sparse, broad dark-brown paleæ. The nearest relative is *A. Whitfordi*. The texture is thinly coriaceous.

30. **Athyrium Whitfordi** Copel. comb. nova. *Diplazium Whitfordi* Copel. in Philip. Journ. Sci. 1 (1906) Suppl. 150.

Mount Mariveles, *Copeland 234, 1970, Whitford 1110, Topping 426, 394 partim*; Zambales province, *Bur. Sci. 4773 Ramos*.

Nearly related to the preceding, from which, judging by collections up to this time, it differs always and very conspicuously in the form of the frond.

31. **Athyrium Bolsteri** Copel. comb. nova. *Diplazium Bolsteri* Copel. Philip. Journ. Sci. 1 (1906) Suppl. 254.

Mindanao, Province of Surigao, *Bolster 264*.

Rhizome suberect, bases of stipes bearing sparse narrow, dark-brown paleæ.

32. **Athyrium geophilum** Copel. spec. nova.

Filix A. Bolsteri affinis, sed multo minor, pinnulis paucis separatis cuneiformibus, rhizomate adscendente, basibus stipitum paleis paucis minutis pallidis vestitis.

Rhizomate 1–2 mm crasso, radicibus basibusque stipitum dense obtecto; stipitibus 2–6 cm altis, nigris, filiformibus, deorsum paleis pallide fuscis 0.5 mm longis sparsis deciduis vestitis, fasciculis vascularibus 2 usque ad laminam distinctis; fronde 5–8 cm alta, 2 cm lata, bipinnata pinnis utroque latere 5–8 pedicellatis vix auriculatis, apice rotundatis dentatisque, infimis reductis; pinnulis cuneiformibus, utroque latere 1–2 liberis, prima acroscopica maxima, rhachidi frondis parallela, dentatis dentibus 1–4, herbaceis, glabris, infra paullo pallidioribus; venulis in dentibus, nec non interdum in pinnulis, solitariis; soris asplenioideis, 1–3 mm longis.

Horn of Negros Mountain, on wet earth under large, mossy rocks, alt. 1,450 m, *Elmer 9884*.

I first mistook this for an *Asplenium* and the bundles of the stipe did not clear its affinity; but the paleæ, though pale, are of *Athyrium* type. Its generic position is finally established by its quite evident affinity to *A. Bolsteri* and *A. Williamsi*, and not to any species of *Asplenium*.

33. **Athyrium Williamsi** Copel. comb. nova. *Diplazium Williamsi* Copel. in Philip. Journ. Sci. 1 (1906) Suppl. 150.

Mindanao, San Ramon, *Copeland 1648*. *Boyce 13*, from Tarlac province, Luzon, seems safely referable here.

There are also two species found about Mount Banajao, which are near *A. Williamsi*, but have the stipes clothed, densely near the base, with crinite, dark brown paleæ. The smaller of these was collected by Steere and determined by Harrington as *A. japonicum*, var. *coreanum*. It is included in *Cuming 56*, and is possibly *Asplenium brachypodum* Baker; but this is more probably a synonym of *Ath. grammitoides*. This fern is simply pinnate with lanceolate fronds, and auricled, serrate pinnæ, the lowest remote, reduced and deflexed. Examples are *Elmer 7964* and *7965*.

The other of these Banajao ferns I have also from Mount Canlaon. It varies from barely bipinnate to deeply tripinnatifid.

GROUP OF A. PINNATUM.

34. **Athyrium pinnatum** (Blanco) Copel. *Allantodia pinnata* Blanco Fl. Filip. ed. 2 (1845) 571. *Callipteris silvatica* Bory, 1804; *Diplazium*, Swtz., 1806; *Athyrium*, Milde, 1870, non Milde, 1866, q. v. supra. *Diplazium petiolare* Presl Epim. (1849) 86. *Athyrium*, Milde, 1870. *Diplazium bulbiferum* Brack., 1854. *Asplenium Brackenridgei* Baker, 1867. For other synonyms of *D. silvatica* Swtz. see Christensen, who also lists *D. tenerum* Presl as a synonym of *D. bulbiferum*.

Luzon, Mount Mariveles, *Williams 83, 205, Copeland 238, 1383, Whitford 234, Topping 531, Leiberg, For. Bur. 1328, Borden:* Mindoro, *For. Bur. 9937 Merritt:* Samar, *Cuming 333* in part: Bohol, *Cuming 349* in part: Mindanao, Lanao, *Clemens 167, 252;* Mount Malindang, *For. Bur. 4735 Mearns & Hutchinson;* San Ramon, *Copeland 1678;* Davao, *Copeland 672.*

India to Polynesia.

Although various authors and illustrious pteridologists have found it necessary to describe this common Philippine fern as a species distinct from *D. silvaticum* Swtz., the differences have never been clear to me, and do not tend to become more so with the accumulation of material. The pinnæ are sometimes rather deeply lobed, but usually not more so than is regarded as characteristic of *D. silvaticum*. Both Baker (Syn. Fil. 234) and Christ (Philip. Journ. Sci. 2 (1907) Bot. 162) try to distinguish the Philippine plant by the stalked pinnæ; but we have specimens from China and Java believed to be representative *D. silvaticum* with the pinnæ fully as long-stalked, and the Javan plant is proliferous in the same manner as is *D. bulbiferum*.

As to the name to be given this fern, I have not used *silvaticum* because one fern is already well known by that binomial and was the first to receive it. Blanco's description fits this fern in almost every respect. Mandaloyan, where Blanco states that this species is common, is a suburb of Manila, and I doubt if the fern survives there now. But it almost certainly grew there once, as it does now in similar places farther from the city; and it is the only similar fern which does grow in just such a habitat. Therefore, if Blanco had any *Athyrium* or any fern nearly fitting his diagnosis, which was once common in Mandaloyan, it must have been this one.

Diplazium petiolare Presl seems by its diagnosis to be a most distinct species. Included in *Cuming 349*, the type collection, we have at least one fertile frond which corresponds closely enough to the description to be without doubt the same plant. This specimen might have come, so close is the resemblance, from the same plant as my No. 1678, from San Ramon. We have the same form from Lanao, as well. If the species were otherwise very uniform, I would be willing to maintain this form as distinct; but as the collections in hand show that it is a variable species, and indicate that there is no open gap between this and other forms, it seems best to unite them. Our specimen of *Cuming 349*, referable here, has the pinnæ lobed less than half way to the costa, but decidedly deeper than in typical *A. pinnatum*. The species is variable in this respect in other lands as well as here. As to the pubescence, it is unusually marked in "*D. petiolare;*" but the rachis bears some, if not so many, hairs of the same fine type, in the channeled upper side of the rachis of every specimen of *A. pinnatum* I have seen, from whatever source; and in Javan as well as Philippine specimens some of this pubescence is always (at least in my plants) present on the stalk of the pinnæ, and at least while young, on the costa. On the convex side of the rachis, it may or may not be evident.

It has already been noted that Christensen treats *D. tenerum* as this species. We have also this fern under *Cuming 338*, the number cited by Presl. But this number seems to include also *A. vestitum*, and a number including these two need not be trusted not to include still others. This species is at any rate not closely related to *A. grammitoides*, as Presl says *D. tenerum* is.

35. Athyrium cultratum (Presl) Milde.

Luzon, *Cuming 190;* Mount Banajao, *Elmer 9012*, rare on banks of water courses in dense woods, alt. 850 m. It is probable that Cuming collected this fern in the same vicinity.

36. Athyrium crenato-serratum (Bl.) Milde.

Mindoro, *Merrill 5916*, much less cut than is typical: Mindanao, *Copeland 1667*.

Malaya.

Javan specimens vary widely enough to include the Mindoro plant.

37. Diplazium inconspicuum Christ in Bull. Herb. Boiss. II 6 (1906) 1000. (Mabacal, Rizal Province, *Loher*, Montalban, *Loher.*)

The sessile, obtuse pinnæ are finely and regularly bicrenulate.

38. Athyrium pallidum (Bl.) Milde.

Luzon, *Cuming 188;* Rizal Province, *Bur. Sci. 1801 Ramos;* Mount Banajao, *Elmer 9016:* Mindoro, *For. Bur. 9950 Merritt:* Negros, *Copeland s. n.:* Palauan, *Bur. Sci. 579 Foxworthy:* Mindanao, Lanao, *Clemens s. n.;* San Ramon, *Copeland 1641;* Davao, *Copeland 956, 1497*.

Malaya, Queensland.

I have not seen *Asplenium camarinum* Baker, described from *Cuming's* collection, number not stated; and I can not discern from the description wherein it is specifically different from *A. pallidum*.

GROUP OF A. ACCEDENS.

39. Athyrium accedens (Bl.) Milde.

Mindoro, *Merrill 1776, Whitford 1402:* Leyte, *Cuming 303:* Mindanao, Surigao, *Bolster 389;* San Ramon, *Copeland 737, 1544;* Davao, *Copeland 663, 949:* Balut, *Merrill 5410*.

Africa to Polynesia.

This is generally, and, I believe, correctly construed as *Diplazium proliferum* (Lam.) Thouars, and I should have accepted that specific name except that it was occupied in *Athyrium* before Milde used it; *decussatum* is likewise preoccupied. The next possibly applicable name, in age, is *Diplazium Swartzii* Bl. Enumeratio 191. In the diagnostic characters of *D. Swartzii* and *D. accedens* Bl. Enum. 192, as given by Blume, the Philippine plant exactly fits the latter; for this reason and because the latter name is already in use in *Athyrium* for this plant, I have thought it unwise to take up and transfer the name *Swartzii*.

GROUP OF A. FRAXINIFOLIUM.

40. **Athyrium palauanense** Copel. comb. nova. *Diplazium palauanense* Copel. in Perkins' Fragmenta (1905) 186.

Palauan, *Merrill 746*: Mindoro, *Merrill 5915*.

This species serves to bridge the gap between the groups of *A. pinnatum* and *A. fraxinifolium*.

Near this, but distinct, is *Williams 2465*, from Mount Apo, Mindanao. It is thinner in texture, the rachis is pubescent and proliferous at the upper end, pinnæ broader at the base, the margin more regular, and the sori like those of *A. pallidum*, rather than like those of *A. pinnatum*, as are those of *A. palauanense*.

41. **Athyrium fraxinifolium** (Presl) Milde.

Diplazium bantamense Blume, Enumeratio (1828) 190. For other synonyms, see Christensen.

Luzon, *Cuming 276*; Benguet, *Elmer 6222*; Rizal, *Merrill 1606*, *Bur. Sci. 2626 Ramos*: Negros, *Copeland 60*, *80*, *Whitford 1598*: Leyte, *Cuming 305*: Mindanao, Surigao, *Bolster 309*; San Ramon, *Copeland 1656*; Mount Apo, *Copeland 1490*: Balabac, *Steere*.

Malaya, India, Japan.

I have the long tried to maintain *bantamense* and *fraxinifolium* as distinct, but am now satisfied that it should not be done. There is every intermediate step between specimens with the veins all free, and those which have them regularly, if not very copiously uniting. It also often happens that on different parts of a single plant, and, in fact, of a single frond, as is true of *Cuming 305*, there are some areas where the veins anastomose regularly, and others where they are very nearly all free. The pinnæ are sometimes entire, sometimes serrulate to the apex. I have not been able to detect any correlation between margin and venation, in this species.

42. **Athyrium Cumingii** (Presl) Milde.

Luzon, *Cuming 116*; Mount Banajao, *Whitford 1110*, *Elmer 2987*, *9030*; Mindoro, *Merrill 5912*, *For. Bur. 12232 Rosenbluth*.

Celebes, teste Christ, Ann. Jard. Buitenz. 15 (1897) 122.

43. **Athyrium tabacinum** Copel. comb. nova. *Diplazium tabacinum* Copel. in Philip. Journ. Sci. 1 (1906) Suppl. 149.

Mount Apo, *Copeland 1490*, *Williams 2510*: Horn of Negros, *Elmer* 9717 (?): Mindoro, *For. Bur. 9925 Merritt*, sterile.

44. **Athyrium pariens** Copel. comb. nova. *Callipteris pariens* Copel. in Perkins' Fragmenta (1905) 186.

Mount Apo, *Copeland 1287*, *1494*: Horn of Negros, *Elmer 9716*.

Although this is unquestionably very near the preceding and the two grow mixed in both places where they have been found, there are other differences evident enough so that, without noticing the venation Elmer kept the two separate in the field. And so far as experience goes, the venation characters of both are constant.

45. **Athyrium cordifolium** (Blume) Copel. comb. nova. *Diplazium cordifolium* Blume, Enumeratio (1828) 190.

Luzon, Laguna Province, *For. Bur. 8892 Curran:* Mindoro, *Merrill 5909, 5910, 5911:* Palauan, *Bur. Sci. 574 Foxworthy:* Leyte, *Cuming 307:* Mindanao, Agusan, *For. Bur. 7612 Hutchinson;* Mount Apo, *Copeland 1109;* Lanao, *Clemens s. n.;* San Ramon, *Copeland 1656:* Jolo, *Merrill 5320.*

Malaya.

In the margin of page 190 of his copy of Blume's Enumeratio, J. Smith wrote "1 [*D. cordifolium*] and 3 [*D. integrifolium*] the same;" and opposite the latter, "is *C. ovata* J. Sm.," and "*D. ovatum* Wall."

GROUP OF A. PORPHYRORACHIS.

46. **Athyrium Merrilli** Copel. comb. nova. *Diplazium Merrilli* Copel. in Philip. Journ. Sci. 2 (1907) Bot. 128.

Mindoro, *Merrill 5914.*

This is not at all nearly related to *Athyrium zeylanicum* (Hook.) Milde, but is very close to **A. porphyrorachis** (Baker) Copel. comb. nova. *Asplenium porphyrorachis* Baker. Journ. Bot. (1879) 40. The specimens in hand, of the two, leave *A. Merrilli* distinguishable by its broader and imbricate segments, not separate even at the base of the frond.

SPECIES EXCLUDENDA.

ATHYRIUM BENGUETENSE Christ, Philip. Journ. Sci. 2 (1907) Bot. 161=*Dryopteris gracilescens* (Bl.) O. K.

FERN GENERA NEW TO THE PHILIPPINES.

By EDWIN BINGHAM COPELAND.
(*From the Bureau of Education, Manila, P. I.*)

BALANTIUM Kaulf.

The fern described as *Dicksonia Copelandi* Christ, Philip. Journ. Sci. **2** (1907) Bot. 183, is most nearly related, as Christ stated, to *D. straminea* Labill. and *D. coniifolia* Sw. Both of these species are *Balantium*, as that genus is construed by Diels and Christensen; and I have the authority of Dr. Christ for calling this one **Balantium Copelandi** Christ.

The Australian plant known as *Davallia dubia* R. Br., doubtfully placed by Christensen in the section *Leucostegia*, is also a *Balantium*, and should be called **Balantium dubium** (R. Br.) Copel. It was placed in this genus by Presl, Tent. Pterid. 134, *Pl. 5, Fig. 4*, as *B. brownianum*. It shares with *B. Copelandi* as peculiar a characteristic as the mottled rachises.

The position of the genus is worthy of a word. The annulus of *B. dubium* is often unmistakably uninterrupted; in some cases it is apparently interrupted by the pedicel. The completeness of the annulus does not seem to me to be a fixed character here. But even if it is, there are other *Polypodiaceae* with oblique annulus; *Plagiogyria*, for instance. The other character on which Diels excludes *Balantium* from the *Polypodiaceae* is the elevated and tracheid-bearing receptacle; but he uses this structure as a genus character of *Microlepia*. The sori of my specimens agree with Hooker's figure, Sp. Fil. 1: *plate 24, C*, rather than with Presl's, cited above. In or near *Dennstaedtia*, we have already *D. scandens* (Bl.) Moore, whose indusium is sometimes not more highly developed than that of *B. dubium*, and sometimes entirely wanting.

In spite of the stump-like stem, the affinity of *Balantium* to *Dennstaedtia* (including *Microlepia*) is very evident and very close. Its affinity to *Dicksonia* is likewise not in question. If we sometime understand thoroughly that the *Cyatheaceae* constitute a homogenetic group which includes *Dicksonia* and *Balantium*, then the intimate relationship of *Balantium* and *Dennstaedtia* need not prevent the placing of *Balantium* in that family; for if the doctrine of descent were proven in every detail, and the gaps between the orders of higher plants made narrower than those between recognizable varieties or subspecies, no reasonable adherent of the doctrine would expect us to cease to recognize the most of the present orders, genera, and species.[1] However, at present, the mutual affinities of the *Cyatheaceae* not being clear, it seems reasonable, with Fée,[2] to place the

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[1] I remember being taught that by a "species" was meant any group of organisms not connected by an essentially complete series of known living or extinct forms with another such group. Such a conception makes it a mere token of contemporary ignorance!

[2] Polypodiaceae, 38, 334.

Dicksonieae near their known relatives in *Davallieae*, rather than, for mere ease of treatment, with their probable relatives, the *Cyatheaceae*.

It is interesting to note that, as would be expected, it is the most generalized of the *Dicksonieae* which is like *Dennstaedtia* and therefore most primitive, and that in *Davallieae* it is the most generalized and primitive group (cf. Phil. Journ. Sci. 2 (1907) Bot. 66, *plate 4*, 125, 126) which is nearest *Balantium*. So primitive a group as *Balantium* is necessarily ancient, and its age is further attested by its distribution.

BRAINEA Hooker.

A sterile plant collected by *Merritt, For. Bur. 8741*, in Mindoro, can be determined almost positively as *Brainea insignis* Hooker. This is perhaps the most striking of the few evidences the ferns present of direct floral intercourse between the Philippines and the continent of Asia.

PERROTTET AND THE PHILIPPINES.

By C. B. Robinson.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

Samuel Perrottet, who had during the preceding two years occupied the position of botanical-horticulturist at the Jardin des Plantes at Paris, was chosen, in 1818, to accompany an expedition to the tropics in the interests of agriculture and botany. He left Paris on the 9th of October of that year, five days later reached Rochefort on the west coast of France, and sailed thence on *Le Rhone* on the 1st of January, 1819. The first stop was at Cayenne on the coast of South America, where they remained from the 1st to the 27th of February; they reached Praya in the Cape Verde Islands on the 10th of April, and Réunion in the Mascarene Islands on June 26. They again sailed on July 27, arrived at Sourabaya in Java on September 13, left October 15, and reached Zamboanga in Mindanao on a date not stated. They were here until December 2, and arrived at Cavite on December 23. From here Perrottet says that he explored the Island of "Manille" in all directions, but had to leave too soon, as his orders had to be fulfilled. These were to engage Chinese to introduce the methods of tropical agriculture into the French colonies, and when they sailed they had with them thirty-seven of this race, of whom one was taken as far as France. They sailed from Manila on the 17th of March, 1820, came to Réunion on May 5, Madagascar on June 6, and Cayenne on August 10, where they remained until the 1st of June, 1821. Thence he returned on *La Durance*, which had accompanied them on their southern journey, reached Havre on July 18, and Paris on the 1st of August.

The main object was to introduce into the French colonies named, such tropical plants as were likely to be of value, and much was done in this direction. In addition, they brought back to Paris, seeds, living and dried plants. The former were cultivated at the Jardin des Plantes, and three years later Perrottet published in the Mémoires of the Linnaean Society of Paris, a "Catalogue raisonné des plantes introduites dans les colonies françaises de Mascareigne et de Cayenne, et de celles rapportées vivantes des mers d'Asie et de la Guyane, au Jardin des Plantes de Paris."[1]

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[1] *Mém. Soc. Linn. Paris* 3 (1824) 89–151.

The Philippines are not mentioned by name in this title, and the paper has hitherto escaped attention as an important contribution to Philippine botany. In it there are reported from the Archipelago no less than 65 species of plants, including 26 described as new, some of them indicated only by their native names, others natives of other countries but obtained at Manila. Of all these there are only a few which were not previously described by other authors.

The present paper is based entirely upon the descriptions. Perrottet's types were living plants, and I do not know whether any material was preserved from them. With few exceptions they are easily identified.

The date of the publication of his paper is usually given as 1825, but it certainly appeared in 1824. The entire volume of which it forms a part is dated 1825, but it was published in parts, under the name "Annales de la Société Linnéenne de Paris," published, or at least dated, at intervals of two months, and Perrottet's paper is in the part dated May, 1824.

He credits to the Philippines the following species:

ACHRAS SAPOTA L. A new variety said to occur at Manila, but without description. The species is commonly cultivated in the Philippines.

ACHRAS TCHICOMAME Perr., described as a new species. This is *Lucuma mammosa* Gaertn., a species introduced from tropical America and occasionally cultivated in the Philippines. It is known locally as "Chico-mamey," whence Perrottet's specific name.

ANNONA MURICATA L., an American species also commonly cultivated in the Philippines.

ARECA CATECHU L., very common in cultivation throughout the Philippines.

ARUM, said to be an undescribed species, but unnamed, and without any clue as to its identity.

BAMBUSA ARUNDINACEA Willd. Several varieties or species of bamboos were obtained in Java and the Philippines, but are only specified by native names, none of them Philippine.

BAUHINIA INERMIS Perr., undescribed, native of the mountains of the Philippines.

BROMELIA PIGNA Perr., said to be a new species, is the common pineapple, the specific name taken from its common Spanish name, "Piña."

BUTONICA SPECIOSA R. is *Barringtonia asiatica* (L.) Kurz.

CAESALPINIA LAEVIGATA Perr. is *C. nuga* Ait.

CALAMUS ROTANG L. and four other species from the Philippines and Java, but without specific names. Two of them from the common names given are Philippine, *C. rotang* is not.

CASSIA ALATA L. is common in the Philippines.

CASTANEA SINENSIS Perr., a new species from China, but obtained at Manila, without description, may possibly be the litchi.

CAVANILLA PHILIPPENSIS Lam. is *Diospyros discolor* Willd. The former is the oldest specific name, but before the transfer to *Diospyros* was made, it had already been used in that genus for a different species.

CHRYSOPHYLLUM PHILIPPENSE Perr. is almost the only case where Perrottet's name displaces one already in use. The species is certainly that at present known as *Palaquium oleiferum* Blanco, and it requires the formation of a new binomial, **Palaquium philippense (Perr.)**.

CITRUS AURANTIUM MANDARINUM Perr. is the commonly cultivated small orange of Manila.

CLERODENDRON PANICULATUM Perr. is the oldest specific name for *C. intermedium* Cham., widely distributed in the Philippines, but it had already been used by Linnaeus for a different species.

CLITORIA PHILIPPENSIS Perr. is *C. ternatea* L.

COCOS NUCIFERA is undoubtedly correct.

CROTON CAMAZA Perr. is probably *C. tiglium* L. The most common native name of the latter is "Camaisa," and undoubtedly this must have been what Perrottet had chiefly in mind. The description, however, is by no means satisfactory for this species.

DIANELLA PHILIPPENSIS Perr. is entirely without description; a native of Mindanao. Two species of *Dianella* occur in the Philippines, but both at higher altitudes than Perrottet is likely to have reached. It is much more probable that his plant was *Dracaena angustifolia* Roxb.

DIOSPYROS NIGRA Perr. is *D. ebenaster* Retz.

DOLICHOS BULBOSUS is *Pachyrrhizus bulbosus* (L.) Kurz.

ELAEAGNUS PHILIPPENSIS Perr. *E. cumingii* Schlecht. is common in the Philippines, and in such places that Perrottet might have collected it, but his description is so definite that this identification must be rejected. The species intended is *Capparis micracantha* R. Br., and the priority is doubtful, as both names were published in the same year.

EPIDENDRUM VANILLA L. is a species of either *Dendrobium* or *Vanilla:* Perrottet's identification is undoubtedly wrong.

EUGENIA DJOUAT Perr. is *E. jambolana* Lam. Perrottet's specific name is from one of the common local names of the species, "Duhat."

ILLICIUM SAN-KI Perr. is probably a mixture. The fruits of the star-anise were the first vegetable products described as Philippine, taken hence to Europe by Cavendish in 1587. The name "San-ki" is still used by the Chinese of Manila for this species, but it is not a native of this Archipelago, and not known here except as imported. Perrottet's name was professedly from Chinese sources, and this plant must typify his species. He also describes a living plant, and must have had a different one in view. The most likely identification of the latter is *Clausena anisum-olens* (Blanco) Merr.

INGA CAMATCHILI Perr. is *Pithecolobium dulce* (Willd.) Benth., an American species now very common in the Philippines and universally known as "Camanchili."

LAURUS CINNAMOMUM L. is said to have been obtained at Manila, but it is not indigenous here.

LHERITIERA LITTORALIS, now generally known as *Heritiera littoralis*, is common along the coasts of the Philippines.

MANGIFERA INDICA L. A new but unnamed variety is reported from Manila.

MIMOSA SCANDENS L. said to be the "Beyugo" of the Philippines. The name "Bejuco" is applied to various species of *Calamus* and *Daemonorops*, but it is not unlikely that Perrottet really had the species to which he refers, *Entada scandens* (L.) Benth.

MIMUSOPS ELENGI. Commonly cultivated in the Philippines.

MORINDA UMBELLATA L. is found in the Philippines, but *M. tinctoria* Roxb., is commoner, and Perrottet might have had either or both.

MORINGA NUX-BEN Perr. is *Moringa oleifera* Lam.

MUSA ABACA Perr. is *M. textilis* Née, the common Manila hemp, locally known as "Abacá."

MUSA CHAPARA Perr. is said to be a species of banana of recent importation into the Philippines from Cochin China, and to be still rare. The description is altogether too incomplete to admit of its identification at present, though it is presumably a variety of *M. paradisiaca* L.

MUSA HUMILIS Perr. is capable of identification, as it is a variety well known, especially at Zamboanga, and there highly esteemed. At present, there is no sufficient ground for separating specifically either it or M. NIGRA, next described, from the common banana.

NERIUM TINCTORIUM is not that species, but from the description probably *Alstonia scholaris* R. Br.

NIPA FRUTICOSA Lam. is *Nypa fruticans* Wurmb., very common along tidal streams throughout the Philippines.

PANAX FRUTICOSUM L. is commonly cultivated in gardens, as stated by Perrottet.

PANDANUS LATIFOLIUS Perr., a splendid species with leaves 6 m long and 32 cm wide, growing on rocks on a small island of the Strait of Basilan. Its identity is not quite certain at present, it may be *Pandanus dubius* Spreng., or it may be a distinct species. Its rediscovery can alone determine the problem.

PIPER BETEL L. Common in cultivation.

RHIZOPHORA TAGAL Perr. is the widely distributed mangrove tree known as *Ceriops candolleana* Arn., based on *Rhizophora timorensis* DC. Prodr. 3 (1828) 32. But this is antedated by Perrottet's name, and the species must be called **Ceriops tagal** (Perr.). The common Philippine name for this species is "Tangal," whence Perrottet's specific name.

SAGUS GOMUTUS Perr. is *Arenga saccharifera* Labill.

SAGUS RHUMPHI is *Corypha* sp., not *Sagus rumphii* Willd.

SMILAX, a new species named Macabujay, is probably *Tinospora crispa* Miers, to which the name is usually applied, and to which Perrottet's remarks apply, so far as they go.

STERCULIA FOETIDA L. A very common species.

TABERNAEMONTANA SEMPERFLORENS Perr. is *T. pandacaqui* Poir.

TABERNAEMONTANA ARBORESCENS Perr. is a common tree species of this genus, fairly distinct in the field, but very difficult to separate from the preceding on herbarium material, and its position can not yet be satisfactorily stated.

Ten other species are credited to the Philippines, but without even generic identification. From the native names and descriptions it is possible to place some of them with certainty, but some of the names given are probably Javan and not Philippine. "Acle des Indiens de Manille" is *Pithecolobium acle* (Blanco) Vidal, if that is really its generic position; "Arbol a brea des Indiens" is *Canarium luzonicum* (Blume) A. Gray; and "Banava" is *Lagerstroemia speciosa* (L.) Pers.

PHILIPPINE FREYCINETIA.

By Elmer D. Merrill.
(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

Philippine *Pandanaceae* had received little attention before the year 1900 either from collectors or systematists. However, in 1900, Warburg published his monograph of the family,[1] recognizing three genera, *Sararanga,* a monotypic genus, its single species, *S. sinuosa* Hemsl., known only from the Solomon Islands and New Guinea, *Freycinetia* with 62 species, extending from Ceylon and Burma to Formosa, Malaya, northern Australia, Polynesia, and the Hawaiian Islands, with 7 species in the Philippines, and *Pandanus* with 156 species, extending from tropical Africa to tropical Asia, Malaya, Australia, and Polynesia, with but a single species definitely recorded from the Philippines, and five Philippine species described by Blanco considered as doubtful ones.

Before the publication of Warburg's monograph four species of *Freycinetia* had been described from the Philippines by various authors, Warburg adding three additional ones, but recent collections have added a considerable number of species of the genus to the known Philippine flora, while a second species of *Sararanga,* (*S. philippinensis Merr.*), has been found on the east coasts of Luzon and Samar, and a large number of species of *Pandanus* have been described and the *status* determined of most of Blanco's imperfectly described species.

In Martelli's recent paper on the Philippine species of *Pandanus*[2] twenty-three species with several varieties are recognized as occurring in the Archipelago, beside three doubtful species, while more recent collections have added two or three additional ones to the list. As many of the species of *Pandanus* and *Freycinetia* are very local, it is very probable that we do not know more than one-half the species of either genus actually growing in the Philippines.

The first species of *Freycinetia* described from the Philippines was *F. luzonensis* Presl Epim. Bot. (1851) 238, but previously Gaudichaud had figured, but not described, what is apparently the same species under the name of *F. cumingiana,* and also a second Philippine species, *F. sphaerocephala,* in the Botany of the Voyage of the Bonite, Atlas, 1843. In 1883, Naves in the Novissima Appendix to the third edition of Blanco's Flora de Filipinas, 285, 286, enumerates four species, which are all, with the possible exception of *F. luzonensis,* admitted on erroneous identifications, and can be ignored. He reduced *Tillandsia pseudo-ananas* Blanco to *Freycinetia insignis* Blume, but this is a manifest error, as an examination of Blanco's description shows conclusively that *Tillandsia pseudo-ananas* can not be a *Freycinetia,* but is probably a *Pandanus,* and possibly the same as *P. copelandii* Merr. Blanco did not consider any species of *Freycinetia* in his Flora de Filipinas.

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[1] Pflanzenreich 3 (1900) 1–97.

[2] *This Journal* 3 (1908) *Bot.* 59–72.

Having recently had an opportunity to examine the types or authentic material of all the Philippine species considered by Warburg, in the herbaria at Kew and Berlin, it became evident that a certain number of recently described forms were invalid, three of the species described by Mr. Elmer, and one by myself. In justice to Mr. Elmer, however, it is manifest that the determination of two of his species as new, *F. lucbanensis* and *F. confusa,* was due to errors in Warburg's monograph, the former being identical with *F. ferox* Warb., the leaves of the type of which are about 1 m long but described as 30 cm long, the latter being the same as *F. vidalii* Hemsl. The affinity of the latter was recognized by Mr. Elmer, but Hemsley's species was placed by Warburg in the wrong section of the genus, the type being a very immature specimen.

In view of the fact that a recent paper has been published on Philippine *Pandanus,* it has been thought advisable to prepare a list of the known species of the other large genus in the family, *Freycinetia,* giving also a provisional key to the species. Twenty-four species are recognized, all of which are endemic in the Philippines, so far as is known, giving the Archipelago a far greater known number of species than any other geographical region in which the genus is found. Luzon alone has eighteen species, while the region about Mount Banajao, Province of Tayabas, Luzon, is remarkable in having no less than eleven species of the genus, more than are known from any single island in the Malayan region; New Guinea and the Malay Peninsula coming first with but eight species, Celebes next with seven, Java with six, Borneo and New Caledonia with four each, Sumatra with three, and various other islands with one or two species each. The above distribution list is based largely on Warburg's monograph, and the number of species actually known from some of the above islands may be larger than the figures given, while undoubtedly a great many undescribed forms remain to be collected.

Stigmas 1 to 3, usually 2. § OLIGOSTIGMA.
  Leaves about 1 m long, 5 to 8 cm wide.
    Leaves long and gradually acuminate; syncarps 3-nate, about 3 cm in diameter. 1. *F. ferox.*
    Leaves abruptly acuminate; syncarps 3 or 4-nate, 5 to 7 cm in diameter. 2. *F. maxima.*
  Leaves much less than 1 m long.
    Leaves oblong, 3.5 to 4.5 cm wide, abruptly short acuminate. 3. *F. oblongifolia.*
    Leaves lanceolate or linear-lanceolate, 2.5 cm wide or less, usually slenderly long acuminate.
      Leaves 10 to 15 cm, rarely 18 cm long. 4. *F. luzonensis.*
      Leaves 20 to 60 cm long.
        Syncarps 2 cm long or less; leaves about 40 cm long, 5 to 6 mm wide. 5. *F. vidalii.*
        Syncarps 4 to 11 cm long.
          Mature syncarps about 4 cm long.
            Leaves about 20 cm long. 6. *F. robinsonii.*
            Leaves 40 to 50 cm long. 7. *F. curranii.*
          Mature syncarps 7 to 11 cm long.
            Syncarps 4-6-nate, about 7 cm long; leaves 20 to 30 cm long. 8. *F. multiflora.*
            Syncarps ternate, about 11 cm long; leaves 40 to 60 cm long. 9. *F. auriculata.*
Stigmas 3 to 10. § PLEIOSTIGMA.
  Syncarps cylindrical, 3 to 5 times as long as broad.
    Leaves 2 cm wide or less.
      Leaves 20 to 25 cm long, gradually narrowed upwards to the long and slenderly acuminate apex; syncarps binate or ternate, 2.5 to 3.5 cm long. 10. *F. palawanensis.*
      Leaves 10 to 18 cm long, not caudate-acuminate; syncarps 4-nate or 5-nate, 2 cm long or less. 11. *F. jagorii.*
    Leaves 2.5 to 5.5 cm wide.
      Leaves abruptly short acuminate.
        Leaves 30 to 40 cm long, margins scabrous near the base and apex only, the median portions smooth. 12. *F. philippinensis.*
        Leaves about 1 m long, margins scabrous throughout. 13. *F. rigida.*
      Leaves gradually and slenderly long acuminate.
        Leaf margins scabrous only near the base and apex. 14. *F. scabripes.*
        Leaf margins scabrous throughout.
          Leaf base dilated, the stipule free above. 15. *F. dilatata.*
          Leaf base not dilated, the stipule attached along one side throughout its length. 16. *F. negrosensis.*
  Syncarps globose or subglobose.
    Leaves 4 to 5 cm wide, abruptly short acuminate.
      Leaves strongly auricled at the base. 17. *F. merrillii.*
      Leaves not auricled at the base. 18. *F. megacarpa.*
    Leaves not exceeding 2 cm in width.
      Leaves 2 to 3 mm wide. 19. *F. monocephala.*
      Leaves 7 to 20 mm wide.
        Leaves 6 cm long or less. 20. *F. sphaerocephala.*
        Leaves exceeding 6 cm in length.
          Leaves 1.5 to 2 cm wide.
            Leaves 9 to 13 cm long. 21. *F. rostrata.*
            Leaves about 20 cm long. 22. *F. warburgii.*
          Leaves less than 1 cm wide.
            Leaves less than 10 cm long. 23. *F. ensifolia.*
            Leaves 15 to 25 cm long. 24. *F. williamsii.*

1. **Freycinetia ferox** Warb. Pflanzenreich 3 (1900) 33.

Freycinetia lucbanensis Elm. Leafl. Philip. Bot. 1 (1907) 212.

LUZON, without locality, *Warburg s. n.*, in Herb. Berol. (type), carbon impression in Herb. Bur. Sci.: Province of Tayabas, Lucban, *Elmer 8830*, May, 1907, type of *Freycinetia lucbanensis* Elm.

The species described by Elmer is identical with that of Warburg, but neither specimen is mature. In the original description of the species Warburg erroneously describes the leaf as 30 cm long, but the type, which I have examined in Herb. Berol., has leaves about 1 m long, Warburg's "30 cm" being a typographical error for, probably, 80 cm. Because of this error, Mr. Elmer did not recognize the identity of his plant with Warburg's species. The type of *F. ferox Warb.* was from central Luzon, probably Tayabas Province.

2. **Freycinetia maxima** sp. nov. § *Oligostigma.*

Robusta, scandens, ramis circiter 3 cm diametro, teretibus; foliis numerosis, dense imbricatis, flaccide-coriaceis, utrinque reticulatis, 0.5 ad 1 m longis, 7 ad 8 cm latis, anguste oblongo-lanceolatis vel lanceolatis, apice abrupte breviter acuminatis, basi paullo augustatis ibique marginibus membranaceis pallidis vel purpureis 6 ad 15 cm longis, usque ad 2 cm latis, instructis, totis marginibus valde spinuloso-serratis, costa subtus, in partibus superioribus, spinulosis. Spadicibus fructiferis ternis vel quaternis, oblongo-ellipsoideis vel anguste oblongo-obovoideis, 15 cm longis, 6 ad 7 cm diametro, leviter longitudinaliter sulcatis vel subcylindraceis; pedunculis circiter 2.5 cm longis, 1 cm crassis; fructibus immaturis linearibus, 1.5 cm longis, 1 mm diametro; stigmatibus 2 vel 3.

LUZON, Province of Tayabas, Malicboi, *For. Bur. 10754 Curran*, July 22, 1908: Albay-Sorsogon, Adumoy Hills, *For. Bur. 12381 Curran*, June, 1908.

A species apparently most closely allied to the preceding and to *Freycinetia latispina* Warb., of Celebes, but distinct from both, and from all other described forms. It is remarkable for its large leaves, which are relatively broad, strongly reticulate, on their margins and in the upper part of the lower surface of the midrib, strongly spinescent, but more especially remarkable for its very large syncarps, each composed of several thousand fruits.

3. **Freycinetia oblongifolia** sp. nov. § *Oligostigma.*

Robusta, scandens, circiter 4 m alta; ramis teretibus, 1 cm crassis; foliis submembranaceis, oblongis vel oblongo-lanceolatis, circiter 20 cm longis, 4 ad 5 cm latis, basi angustatis, haud vaginantibus; apice breviter abrupteque acuminatis, margine prope basin apicemque denticulatis, in media parte inermibus. Inflorescentiis terminalibus, spadicibus femineis ternis vel quaternis, bracteis multis imbricatis roseis, acutis vel acuminatis, marginibus costisque glabris vel apicem versus dentatis, exterioribus 1 ad 2 cm longis, circiter 1.5 cm latis, interioribus 6 ad 8 cm longis, 2.5 ad 3 cm latis, circumdatis. Spadicibus fructiferis, cylindraceis, aurantiacis, circiter 7 cm longis, 2 cm latis; fructibus circiter 2.5 mm diametro basi plus minus succulentis, supra lignosis, angulatis; stigmatibus 2.

MINDANAO, Province of Surigao, Surigao, *Bolster 342, 249*, May and February, 1906, in forests, 100 to 130 m altitude.

4. **Freycinetia luzonensis** Presl Epim. Bot. (1851) 238; Warb. in Pflanzenreich 3 (1900) 35; Miq. Fl. Ind. Bat. 3 (1859) 172; Vidal Phan. Cuming. Philip. (1885) 154; Rev. Pl. Vasc. Filip. (1886) 280.

Freycinetia cumingiana Gaudich. Bot. Voy. Bonite (1843) *t. 60 et t. 37, f. 12–14*, sine descr.; C. B. Robinson in Bull. Torr. Bot. Club 35 (1908) 64.

LUZON, Province of Camarines Sur, *Cuming 1455;* Mount Isarog, *For. Bur. 11361 Curran*, May, 1908.

I have examined the number collected by Cuming, cited above, in the Kew and Berlin herbaria, and find that Presl's species is distinct from the form previously determined by me as *F. luzonensis* Presl.* It is possible that more than one form is included by Presl in the original description of the species, but this can only be determined by an examination of the material in Presl's herbarium. The specimens I have seen of Cuming's number, seem to agree perfectly with the figure of *F. cumingiana* Gaudich., which, following Warburg, is here considered to be a synonym of *F. luzonensis*. Although the plate representing Gaudichaud's species was published some years earlier than Presl's species, still the description of the plate, but no description of the plant, was not published until 1866 in Charles d' Alleizette's explanation of the plates, 3: 133. Dr. Robinson considered that the *Freycinetia luzonensis* of recent botanists, including Warburg, was different from *F. luzonensis* of Presl, but I am inclined to consider that Warburg correctly interpreted Presl's species, and also correctly reduced to it Gaudichaud's *F. cumingiana*. The material that has been considered as *F. luzonensis* Presl, in this office, and distributed as such, certainly does not represent Presl's species, and is below described as new.

5. **Freycinetia vidalii** Hemsl. in Kew Bull. (1896) 166; Warb. l. c. 36.

Freycinetia confusa Elm. Leafl. Philip. Bot. 1 (1907) 213; non Ridley, Mater. Fl. Malay Penin. 2 (1907) 233.

LUZON, Province of Nueva Viscaya, Bayombon, *Vidal 3964* in Herb. Kew (type): Province of Tayabas, Lucban, *Elmer 9007*, type of *F. confusa* Elm.

I have examined the type of this species in the Kew Herbarium, and Elmer's *Freycinetia confusa* is manifestly identical. The species belongs in the section *Oligostigma*, although Warburg placed it in the section *Pleiostigma*. The type is an immature specimen, and there is nothing in the original diagnosis from which the proper section can be determined.

6. **Freycinetia robinsonii** sp. nov. § *Oligostigma*.

Scandens, 2 ad 4 m alta; ramis 1.5 ad 2 cm diametro, ramulis 3 ad 5 mm crassis; foliis submembranaceis, anguste lanceolatis, circiter 20 cm longis, 1 ad 2 cm latis, basi plus minus angustatis vaginantibusque, apice sensim acuminatis, vulgo toto margine et subtus in costis spinuloso-serratis; inflorescentiis terminalibus, spadicibus femineis 4 vel 5, bracteis multis rubris 6 ad 7 cm longis oblongo-ovatis caudato-acuminatis, acuminibus spinuloso-serratis, exterioribus foliaceis, circumdatis; spadicibus fructiferis cylindraceis, oblongis, 3 ad 5 cm longis, 1 ad 1.5 cm crassis; fructibus circiter 5 mm longis, apice angulato-pyramidatis; stigmatibus 2 vel 3; pedunculis 3 cm longis, scabris.

LUZON, Province of Bataan, Lamao River, *Merrill 3791*, January, 1904; *Williams 338*, December, 1903; *For. Bur. 2194, 2827 Meyer; For. Bur. 752, 2466, 3037* (type) *Borden; Whitford 1311*, June, 1905 and *s. n.*, July, 1904; *Copeland*

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* *Philip. Journ. Sci.* 1 (1906) Suppl. 25.

252, January, 1904: Province of Laguna, Los Baños, *Hallier s. n.*, December, 1903; *Elmer 8242*, April, 1906: Province of Zambales, Mount Abu, *Bur. Sci. 2006 Foxworthy*, December, 1906: Province of Benguet, Sablan, *Elmer 6196*, April, 1904.

A species allied to *Freycinetia luzonensis* Presl, and to *F. multiflora* Merr., differing from the former in its longer leaves, longer and differently shaped syncarps which are more numerous, and from the latter in its shorter, fewer syncarps and shorter leaves. It is the species previously determined by me as *F. luzonensis* Presl.[4]

7. **Freycinetia currani** sp. nov. § *Oligostigma.*

Scandens; ramis teretibus, circiter 1.3 cm crassis; foliis numerosis, congestis, coriaceis, nitidis, pallidis, lineari-lanceolatis vel anguste lanceolatis, 40 ad 50 cm longis, 2 ad 3 cm latis, apice sensim longe acuminatis, basi vix angustatis, vaginantibus, marginibus apicem basimque versus spinuloso-dentatis, in media parte inermibus, costa subtus in parte superiore spinuloso-aculeatis. Spadicibus ternis, fructiferis oblongis, cylindraceis, circiter 4 cm longis, 1 ad 1.3 cm crassis; fructibus cylindraceis, angulatis, basi plus minus carnosis, partibus superioribus liberis, 3 mm longis, angulatis, truncatis, stigmatibus 2 vel 3; pendunculis scabridis, 2 cm longis.

LUZON, Province of Camarines, Mount Isarog, *For. Bur. 11359 Curran*, May, 1908, in forests at 1,000 m. alt.

A species allied to *F. auriculata* Merr., but with syncarps less than one-half as long as in that species, the auricles at the base of the leaves membranaceous, and attached to the leaf margin for their entire length, with no free ovate portion.

8. **Freycinetia multiflora** Merr. in Philip. Journ. Sci. 2 (1907) 259; Elmer Leafl. Philip. Bot. 1 (1907) 213.

LUZON, Province of Tayabas, Lucban, *Elmer 8039, 9009*, May, 1907: Province of Laguna, Mount Maquiling, *For. Bur. 7768 Curran & Merritt*, October, 1907: Province of Rizal, Bosoboso, *For. Bur. 2994 Ahern's collector*, April, 1905; *Bur. Sci. 2092 Ramos*, February, 1907. MINDORO, Mount Halcon, *Merrill 5647*, November, 1906 (type). MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 73, 1028*, January, 1906, May, 1907; Province of Misamis, Mount Malindang, *For. Bur. 4672 Mearns & Hutchinson*, May, 1906: District of Davao, Mount Apo, *Copeland 1206*, April, 1904.

Closely allied to the preceding, but apparently distinct. *F. luzonensis*, *F. robinsonii*, and *F. multiflora* form a group of allied species, and additional material may lead to a different disposition of some of the specimens cited above.

9. **Freycinetia auriculata** sp. nov. § *Oligostigma.*

Scandens, robusta, ramulis circiter 1 cm crassis; foliis coriaceis, nitidis, 40 ad 60 cm longis, 1 ad 1.5 cm latis, pallidis, apice sensim attenuato-acuminatis, basi haud angustatis, valde vaginantibus, auriculatis, auriculis 7 ad 10 mm longis, obtusis, coriaceis, marginibus aculeatis, costa subtus in partibus superioribus plus minus aculeatis; inflorescentiis terminalibus, bracteis delapsis; spadicibus ternis, fructiferis cylindraceis,

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[4] *Philip. Journ. Sci.* 1 (1906) Suppl. 26.

9 ad 11 cm longis, 2 ad 2.5 crassis; fructibus plus minus carnosis, apice liberis, angustatis, 2 mm longis, valde sulcatis, truncatis; stigmatibus 2; pendunculis 5 ad 6 cm longis, minute scabris.

PALAWAN, near Puerto Princesa, *Bur. Sci. 876 Foxworthy*, May, 1906.

10. **Freycinetia palawanensis** Merr. ex Elm. Leafl. Philip. Bot. 1 (1907–08) 216, 362.

PALAWAN, Victoria Peak, *Bur. Sci. 706 Foxworthy*, March, 1906, alt. 900 m. LUZON, Province of Tayabas, Lucban, *Elmer 7810, 9386*, May, 1907.

11. **Freycinetia jagorii** Warb. in Pflanzenreich 3 (1900) 39, *f. 10, G.*

SAMAR, *Jagor 954*, in Herb. Berol. (type). MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September–October, 1906, and March, April, and June, 1907.

The type, which I have examined in the Berlin Herbarium, is an immature specimen, the material collected by Mrs. Clemens being manifestly the same species.

12. **Freycinetia philippinensis** Hemsl. in Kew Bull. (1896) 165; Warb. l. c. 40.

PHILIPPINES, without locality, *Cuming 1898*, in Herb. Kew. LUZON, Province of Tayabas, *Gregory 117*, August, 1904.

13. **Freycinetia rigida** Elm. Leafl. Philip. Bot. 1 (1908) 362.

Freycinetia hemsleyi Elm. Leafl. Philip. Bot. 1 (1907) 214; non Warb. in Pflanzenreich 3 (1900) 36.

LUZON, Province of Tayabas, Lucban, *Elmer 7847*, May, 1907.

Manifestly allied to the preceding, but distinct. An immature specimen, *Elmer 6217*, from Sablan, Province of Benguet, Luzon may be referable here.

14. **Freycinetia scabripes** Warb. in Pflanzenreich 3 (1900) 41.

Freycinetia banahaensis Elm. Leafl. Philip. Bot. 1 (1907) 215.

LUZON, Province of Bataan, *Warburg s. n.*, in Herb. Berol. (type); Lamao River, *For. Bur. 4529 Maule*, May 30, 1906; *For. Bur. 2826 Meyer*, March, 1905: Province of Tayabas, Lucban, *Elmer 7902*, May, 1907, type of *F. banahaensis* Elm. BATAN (Batanes Islands), *Bur. Sci. 3806 Fenix*, June, 1907.

I have examined the type of the species in the Berlin Herbarium, and consider it to be well represented by the specimens from the Lamao River, cited above. The specimen from the Batanes Islands is certainly the same, and I am unable to distinguish Elmer's *F. banahaensis*, a cotype of which is before me.

15. **Freycinetia dilatata** Merr. ex Elm. Leafl. Philip. Bot. 1 (1907–08) 214, 362.

LUZON, Province of Rizal, near Bosoboso, *Bur. Sci. 99 Foxworthy*, January, 1906; Tanay, *Merrill 2301*, May, 1903: Province of Tayabas, Lucban, *Elmer 9008*, May, 1907.

Plate 437 of the third edition of Blanco's Flora de Filipinas, determined by Naves as *F. luconensis* var. *heterophylla*, is probably referable here: it is not Presl's variety and certainly is not the same as *F. philippinensis* Hemsl.

16. **Freycinetia negrosensis** sp. nov. § *Pleiostigma*.

Scandens; foliis dense imbricatis, coriaceis, nitidis, 60 ad 70 cm longis, circiter 2 cm latis, apice longe sensim angustato-acuminatis, basi vix dilatatis ibique in margine membranaceis, toto margine denticulatis, costa

subtus minute denticulatis. Spadicibus fructiferis terminalibus, binis vel ternis, densis, oblongis, cylindraceis, 7 ad 10 cm longis, 1.5 cm diametro; fructibus circiter 5 mm longis, plus minus angulatis, apice truncatis; stigmatibus 5 vel 6.

NEGROS, Mount Silay, *Whitford 1541*, May, 1906, in forests on exposed ridges at an altitude of about 1,200 m.

This species is allied to the preceding, and in the preliminary work on the present paper it was considered to be the same as *F. dilatata*. On going over the material with Mr. Elmer, however, it was found that the present species differed constantly from the preceding in its leaves being densely imbricated but not dilated at the base, the membranaceous margins narrower and attached along one side, leaving no free portion at the apex, and by its very dense syncarps and shorter fruits. It has again been collected by Mr. Elmer in southern Negros.

17. ***Freycinetia merrillii*** Elm. Leafl. Philip. Bot. 1 (1907) 216.

LUZON, Province of Tayabas, Lucban, *Elmer 9101*, May, 1907, type.

18. ***Freycinetia megacarpa*** sp. nov. § *Pleiostigma.*

Scandens, ramis ramulisque plus minus triangularibus, 5 ad 10 mm crassis, rubro-brunneis; foliis oblongis vel oblongo-lanceolatis, 14 ad 17 cm longis, 3.5 ad 4 cm latis, submembranaceis, apice breviter acuminatis, basi angustatis, vix vaginantibus, margine apicem versus pauce obscureque denticulatis, inferne integris; inflorescentiis terminalibus, ternis vel quaternis; pedunculis 2 ad 3.5 cm longis; syncarpiis globosis vel ovoideis, 3 ad 5 cm diametro; fructibus carnosis, ovoideis vel obovoideis, usque ad 1.5 cm longis, apice plus minus pyramidatis, angulatis, breviter rostratis; stigmatibus circiter 6.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, March, 1907.

A species manifestly allied to the preceding, but the leaves lacking the prominent basal auricles, and the margins of the leaves in the basal portions entire or subentire.

19. ***Freycinetia monocephala*** Elm. Leafl. Philip. Bot. 1 (1906–7) 78, 218.

LUZON, Province of Tayabas, Lucban, and Mount Banajao, *Elmer 7380, 9012*, May, 1907; *Whitford 971*, October, 1904.

A species well characterized by its usually solitary syncarps and very narrow grass-like leaves.

20. ***Freycinetia sphaerocephala*** Gaudich. Bot. Voy. Bonite (1843) *t. 52*; Warb. in Pflanzenreich 3 (1900) 35.

Freycinetia globosa Merr. in Philip. Journ. Sci. 2 (1907) 260; Elm. Leafl. Philip. Bot. 1 (1907) 217.

Freycinetia strobilacea Vid. Phan. Cuming. Philip. (1885) 154; Rev. Pl. Vasc. Filip. (1886) 280, non Blume.

LUZON, Province of Albay, *Cuming 839*. MINDORO, Mount Halcon, *Merrill 5791*, November, 1906.

Cuming's specimen is probably the type of the species, although Gaudichaud may have collected the same form in the Philippines. A fragment of *Cuming 839* is now in our herbarium, and from the material now available, I find that the differential characters by which *F. globosa* was separated are of no value. The figure of *F. strobilacea* given by Vidal in his Sinopsis Atlas *t. 95, f. B*, was copied from Blume's Rumphia, fide Vidal, l. c. XLII.

21. **Freycinetia rostrata** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 177.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 475*, April, 1906, and without numbers, July, September, October, 1906, April and June, 1907. SAMAR, Lanang, *Merrill 5235*, October, 1906.

22. **Freycinetia warburgii** Elm. Leafl. Philip. Bot. 1 (1907) 218.

LUZON, Province of Tayabas, Lucban, *Elmer 8229*, May, 1907.

A species with the general appearance of *F. luzonensis* Warb., and *F. robinsonii* Merr., but with less acuminate leaves and manifestly in the section *Pleiostigma*.

23. **Freycinetia ensifolia** Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 5; Philip. Journ. Sci. 1 (1906) Suppl. 25.

LUZON, Province of Bataan, Mount Mariveles, *Merrill 3242*, October, 1903; *Whitford 329*, May, 1904; *For. Bur. 2624 Meyer*, February, 1905; *Topping 468; Elmer 6840*, November, 1904; *For. Bur. 6285 Curran*, February, 1907: Province of Pampanga, Mount Abu, *Bur. Sci. 1944 Foxworthy*, December, 1906.

A local species, common on exposed forested ridges on Mount Mariveles, above 1,000 m altitude.

24. **Freycinetia williamsii** sp. nov. § *Pleiostigma*.

Differt a *F. ensifolia* foliis multo longioribus, sensim tenuiter acuminatis, usque ad 20 cm longis, 7 ad 10 mm latis; syncarpiis multo majoribus, binis vel ternis, rariter solitariis, globosis vel ellipsoideis, 2 ad 3 cm longis latisque.

BATAN (Batanes Islands), Santo Domingo de Basco, *Bur. Sci. 3786 Fenix* (type), June, 1907. LUZON, Province of Benguet, *Bur. Sci. 3504 Mearns*, July, 1907; *Elmer 5857*, March, 1904; *Dr. Pond*, March, 1904; *Williams 1013*, October, 1904: Province of Laguna, Mount Banajao, *Bur. Sci. 6075 Robinson*, March, 1908; Mount Maquiling, *For. Bur. 7706 Curran & Merritt*, October, 1907: Province of Rizal, Bosoboso, *For. Bur. 2696 Ahern's collector*, January–March, 1905.

THE OAKS OF THE PHILIPPINES.

By Elmer D. Merrill.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

The first mention of Philippine oaks is in the first edition of Blanco's Flora de Filipinas, in 1837, where three species of *Quercus* are described, and one species of *Castanopsis*, the latter as a *Fagus* and without specific name. The three true oaks, Blanco identified with extra-Philippine species, one as *Quercus molucca* Rumph., of eastern Malaya, one with *Q. glabra* presumably of Thunberg, and one with *Q. cerris* Linn., an European species. In the second edition of the work, the name *Quercus molucca* is changed to *Q. concentrica*, *Q. glabra* is changed to *Q. ovalis*, and a short description of a fourth species, *Q. cooperta*, is added. The identification of these species has caused considerable confusion, and one of the objects of the present paper is to determine their status, so far as possible.

Nothing further appeared regarding Philippine *Quercus* until A. De Candolle's monograph of the family in 1864,[1] when *Quercus llanosii* A. DC., based on specimens supplied by Father Llanos, supposed to represent Blanco's *Quercus concentrica*, and *Q. philippinensis* A. DC., based on a specimen collected in Luzon by Cuming, were described. *Quercus ovalis* Blanco was admitted, with a short diagnosis taken from Blanco's description, while the new name *Q. blancoi* was proposed for Blanco's *Q. glabra*, the author overlooking the fact that in publishing *Quercus ovalis*, Blanco simply proposed a new name for his own *Q. glabra*. *Q. cooperta* Blanco is also included but with doubt as to whether or not it was a true *Quercus*, while a drawing sent by Llanos was identified as probably *Quercus pruinosa* Blume, although so far this species has not been found in the Philippines.

In 1875, Máximo Laguna y Villanueva published in Madrid, a pamphlet of eight pages,[2] with one plate, enumerating the species of *Quercus* previously recorded from the Philippines, and described and figured

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[1] Prodr. 16^2 (1864) 1–123.

[2] Apuntes sobre un nuevo roble (Q. jordanae) de la flora de Filipinas. (1875) 1–8, cum lamina.

Quercus jordanae as a new species, the type material being from the Caraballo Mountains in Central Luzon.

In 1883, F.-Villar[3] credited nineteen species of *Quercus* to the Philippines, two of which were described as new. It is evident that nearly all of these were admitted on erroneous identifications. Many of them it will be quite impossible to identify, but some were cleared up by Vidal.[4]

In 1883, Vidal[5] figured no less than seven species of *Quercus* and two species of *Castanopsis*, two of the former being described as new, while in 1886 ten species of *Quercus* and one *Castanopsis* are enumerated by him[6] with specific names, and two species of *Quercus* and one *Castanopsis* without specific names. Two species of *Quercus* are described as new, while the descriptions of *Q. vidalii* F.-Vill., and *Q. blancoi* A. DC., are amplified.

Wenzig's paper on "Die Eichen Ost- und Südasiens"[7] adds nothing to our knowledge of Philippine oaks, a single species, *Quercus philippinensis* A. DC., being credited to the Philippines, *Q. llanosii*, *Q. ovalis* Blanco, and *Q. blancoi* A. DC., being erroneously reduced to it.

King's valuable paper "The Indo-Malayan Species of Quercus and Castanopsis"[8] does not include the Philippine species, but is the one most useful work in determining the Philippine species of this group.

Six species of *Quercus* are enumerated from the Philippines by Von Seemen,[9] and a single one was described by Hance.

Our Philippine oaks are difficult to determine properly, chiefly because of lack of complete material, and because many of the species were originally described from immature specimens. After an examination of Vidal's types at Kew, some of Blume's types at Leiden, and the types of DeCandolle's Philippine species at Geneva, I was impressed with the discrepancies in the identifications of the Philippine species, and on my return to Manila considered it advisable to examine critically the entire material available, and publish an enumeration of the species. Most of the specimens cited by Vidal I found at Kew, but some of the numbers do not appear to be extant, and while there I succeeded in matching most of Vidal's species with recently collected specimens, although if Vidal's specimens were now before me, I have no doubt but that the present paper would be more accurate, so far as the disposition of his species is concerned.

It is frequently difficult to accurately identify specimens unless they have mature fruits, and for this reason, it is to be expected that some of the specimens referred to definite species below will later be found to be really different, when additional material is secured. I have below disposed the specimens in flower, and those with immature fruits, to the best of my ability, but am not always sure that they are always correctly referred. Although a great number of specimens have been cited, the following paper by no means accounts for all in our herbarium, for I have described no new species excepting those of which mature fruits were available. It is apparent that several forms remain to be described at a later date when more complete material is secured.

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[3] Nov. App. (1883) 207–209.

[4] Rev. Pl. Vasc. Filip. (1886) 260–265.

[5] Sinopsis Atlas (1883) XLI, t. 92.

[6] Rev. Pl. Vasc. Filip. (1886) 260–265.

[7] *Jahrb. Kgl. Bot. Gart. Berlin* 4 (1886) 214–240.

[8] *Ann. Bot. Gard. Calcutta* 2 (1889) 17–107, *pl. 15–104*.

[9] Perkins Frag. Fl. Philip. (1904) 41, 42.

Most of the species of *Quercus* found in the Philippines are endemic, but four species, as here interpreted, being found outside of the Philippines, two in Celebes, *Quercus llanosii* and *Q. ovalis*, if the identification of the Celebes material is correct, and two, *Q. reflexa* King and *Q. bennettii* Miq., in Borneo, the latter extending to Bangka and Malacca.

Nearly all our species of the genus are found in the hill or mountain forests at medium and higher altitudes, but three species being known from comparatively low altitudes, *Q. caudatifolia*, occuring at least as low as 20 m above sea level in Mindanao, and *Q. bennettii* and *Q. soleriana*, being found as low as 100 m on Mount Mariveles, in Luzon. Some species, like *Quercus jordanae*, are very abundant in the mossy forests like those of Mount Data and Mount Tonglon, at altitudes as high as 2,250 m, but the great bulk of the species are found at altitudes of from 400 to 1,500 m.

KEY TO THE PHILIPPINE GENERA AND SPECIES OF FAGACEÆ.

Involucre inclosing the nuts, often splitting irregularly, armed externally with rather long spines, usually containing more than one nut............ 1. *Castanopsis*

Involucre inclosing the nut in few species only, mostly cup- or saucer-shaped, covered with imbricate scales, or zonulate, rarely tuberculate, never containing more than one nut.. 2. *Quercus*

1. CASTANOPSIS Spach.

1. **Castanopsis philippensis** (Blanco) Vidal Rev. Pl. Vasc. Filip. (1886) 265. (***philippinensis***).

Fagus philippensis Blanco Fl. Filip. ed. 2 (1845) 503, err. typ. *philipensis*.

Castanopsis sumatrana F.-Vill. Nov. App. (1883) 210, fide Vidal, non A. DC.

Castanopsis javanica Vidal Sinopsis Atlas (1883) *t. 92, f. I*, non A. DC.

LUZON, Province of Rizal, Bosoboso, *Bur. Sci. 2658 Ramos*, May, 1907; *For. Bur. 2148, 2872, 3100 Ahern's collector*, November, 1904, March, May, 1905. MINDORO, Calausan, *For. Bur. 8547 Merritt*, January, 1908.

The specimens cited above agree with *Vidal 611bis*, in Herb. Kew, collected at Angat, Province of Bulacan, Luzon, and also agree with Blanco's description. Endemic.

A second species, probably undescribed, occurs in the Philippines, enumerated by Vidal l. c., as *Castanopsis* sp., and previously erroneously identified by F.-Villar l. c., as *C. javanica* A. DC., and by Vidal, Sinopsis Atlas l. c., *f. H*, as *C. sumatrana*. I have no specimens of it.

2. QUERCUS Linn.

Involucres cup-shaped, saucer-shaped, or discoid, their bracts imbricate, free or united by their bases only, the apices always free.......... § PASANIA

Leaves more or less pubescent or puberulent beneath.

Leaves subcoriaceous, slightly pubescent beneath, at least along the midrib and lateral nerves, the reticulations lax, very distinct.......... 1. *Q. clementis*

Leaves firmly coriaceous, densely and uniformly ferruginous-pubescent beneath, the reticulations obscure.......... 2. *Q. jordanae*

Leaves entirely glabrous beneath, or at most minutely puberulent.

Leaves mostly exceeding 12 cm in length.......... 3. *Q. llanosii*

Leaves 4 to 6 cm long.......... 4. *Q. luzoniensis*

Involucres cup-shaped, their bracts connate into entire or denticulate concentric lamellæ.......... § CYCLOBALANUS

Glans manifestly longer than broad.

Leaves more or less pubescent or puberulent beneath; glans never more than 12 mm in diameter.......... 5. *Q. caudatifolia*

Leaves entirely glabrous beneath, glans exceeding 12 mm in diameter.

Glans at least 2 cm in diameter.......... 6. *Q. merrittii*

Glans about 1.5 cm in diameter.......... 7. *Q. ovalis*

Glans at least as broad as long, frequently broader than long.

Leaves 8 to 11 cm wide.

Involucres inclosing less than one-third the glans; leaf-margins sometimes somewhat repand above.......... 8. *Q. woodii*

Involucres inclosing about three-fourths the glans; leaf-margins entire. 9. *Q. castellarnauiana*

Leaves 7 cm wide or less.

Leaves more than 6 cm long, strongly acuminate, entire.

Lamellæ of the involucre 5 to 8, usually denticulate.

Leaves densely cinereous-ferruginous-puberulent beneath. 10. *Q. acuminatissima*

Leaves glabrous beneath.

Leaves usually abruptly acuminate.

Leaves 7 to 15 cm long; reticulations on the lower surface fine but evident.......... 11. *Q. soleriana*

Leaves 12 to 25 cm long; reticulations on the lower surface obsolete.......... 9. *Q. castellarnauiana*

Leaves gradually and slenderly caudate-acuminate, 6 to 8 cm long.......... 12. *Q. philippinensis*

Lamellæ of the involucre 3 or 4, obscurely denticulate; leaves abruptly short-acuminate, the acumen blunt.......... 13. *Q. bennettii*

Leaves 5 cm long or less, acute, obtuse, or very obscurely acuminate, the margins sometimes slightly sinuate above.......... 14. *Q. merrillii*

Involucres ovoid, externally tubercular, closed and inclosing the whole glans but not adnate to it except at the base.......... § CHLAMYDOBALANUS

Leaves with about 15 pairs of lateral nerves.......... 15. *Q. cooperta*

Leaves with 10 to 12 pairs of lateral nerves.......... 16. *Q. reflexa*

Involucres large, thick, woody, turbinate, the upper portion tubercled, nearly enveloping the glans and adherent to it on the base and sides; glans bony. § LITHOCARPUS

Leaves somewhat pubescent beneath, the branchlets densely ferruginous-villous; involucre 3 cm in diameter.......... 17. *Q. curranii*

§ PASANIA.

1. Quercus clementis sp. nov.

Arbor 10 ad 13 m alta, inflorescentiis, subtus foliis, ramulisque plus minus ferrugineo-pubescentibus; foliis oblongis vel elliptico-oblongis, rigide chartaceis vel subcoriaceis, 10 ad 18 cm longis, basi acutis, apice breviter obtuseque acuminatis, integris, nitidis, subtus sparse pubescentibus, reticulis laxis, distinctis; cupulis 2 ad 2.5 cm diametro, utrinque dense ferrugineo-pubescentibus; glandibus subcylindraceis, apice subtruncatis, 2 cm longis.

A tree 10 to 13 m high, the branchlets and inflorescence densely ferruginous-pubescent. Branches slender, reddish-brown, ultimately glabrous. Leaves alternate, oblong or elliptical-oblong, 10 to 18 cm long, 4 to 7 cm wide, firmly chartaceous or subcoriaceous, the base acute, the apex rather abruptly and shortly acuminate, the acumen blunt, margins entire, slightly recurved, shining on both surfaces, the upper surface glabrous, or pubescent on the midrib and lateral nerves, the lower surface more or less pubescent on the midrib and nerves, and with scattered hairs on the surface, in age nearly glabrous; lateral nerves 10 to 12 on each side of the midrib, strongly impressed on the upper surface, very prominent beneath, anastomosing and forming a somewhat arched submarginal nerve, the reticulations rather lax, very distinct; petioles stout, more or less pubescent, 5 mm long. Male inflorescence: spikes 8 to 13 cm long, fascicled in the upper axils or in depauperate panicles, densely ferruginous-pubescent; flowers sessile, solitary, the perianth 2 mm long, densely pubescent, 6-lobed; stamens 10, the longer filaments 3 mm. Female inflorescence: spikes 12 to 20 cm long, in terminal panicles, when young densely pubescent, in age subglabrous; flowers solitary, numerous, pubescent. Fruits maturing the second year, the involucres 1 cm high or less, 2 to 2.5 cm in diameter, densely ferruginous-pubescent on both surfaces, the scales on the outer surface very numerous, appressed, imbricate, acuminate, about 2 mm long. Glans 2 cm long and 2 cm in diameter, deciduous-puberulent, subcylindrical, the sides parallel, the apex very abruptly rounded-subtruncate, apiculate.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 906*, February, 1907, and four sheets without numbers from the same locality, April, June, and September, 1907. A closely allied form is represented by *Clemens 1138*, from the same locality, but the specimen has immature fruits and its leaves have about 15 pairs of lateral nerves.

The species above described seems to be allied to *Quercus lamponga* Miq., of the Malayan region, but is apparently sufficiently distinct from that species, the scales of the Involucre not arranged in lamellæ. It is well characterized by its subcylindrical glans that is as long as broad, and its rather laxly and strongly reticulate leaves. According to the collector the bark of this tree peels off in thin papery flakes similar to that of many species of *Betula*.

2. **Quercus jordanae** Laguna Apuntes Sobre Nuev. Roble de Filip. (1875) 7, *cum lamina;* F.-Vill. Nov. App. (1883) 208; Vid. Rev. Pl. Vasc. Filip. (1886) 264; Ceron Cat. Pl. Herb. (1892) 165.

Q. vidalii F.-Vill. Nov. App. (1883) 209; Vidal Sinopsis Atlas XLI (1883) *t. 92, f. B.;* Ceron Cat. Pl. Herb. (1892) 164.

Q. caraballoana F.-Vill. Nov. App. (1883) 209; Vidal l. c. 265; Ceron l. c. 165.

Q. havilandii Von Seem. in Perk. Frag. Fl. Philip. (1904) 42, non Stapf.

Q. sundaica Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 41, non Blume.

LUZON, District of Lepanto, Mount Data, *Merrill 4550*, November, 1905; *Loher 4873:* Province of Benguet, Pauai, *Bur. Sci. 4407. 4480 Mearns*, August, 1907; Mount Tonglon (Santo Tomas), *Williams 1321, 1365*, October, 1904; *For. Bur. 5009 Curran*, August, 1906; Baguio, *Lardizabal 7*, 1901: Province of Bataan, Mount Mariveles, *For. Bur. 1253 Borden*, July, 1904; *Whitford 1186*, March, 1905: Province of Tayabas, Mount Banajao, *For. Bur. 7912 Curran & Merritt*, November, 1907; *Elmer 7903*, May, 1907.

Quercus jordanae Laguna, as here interpreted, is a rather variable species, but after examining the above series of specimens I have concluded that all are referable to one species. *Q. jordanae* was placed by its author in the section *Cyclobalanus*, but all the specimens cited above are manifestly of the section *Pasania*. The species as figured by Laguna has relatively broader leaves than has *Quercus vidalii* as figured by Vidal, but the indumentum seems to be nearly the same in both, as well as the shape of the base and apex of the leaves, and the venation. I have seen the type number of *Quercus vidalii* in Herb. Kew (*Vidal 617 bis*), and it is well matched by the specimens from Mount Mariveles, cited above. His specimen was from the same region as the type of *Quercus jordanae*, the Caraballo Mountains, in central Luzon. The specimens from Lepanto and Benguet differ from those of Mount Mariveles and Mount Banajao in having somewhat more coriaceous and slightly more pubescent leaves, and rather more pubescent involucres, the scales being also more prominent, but good differential specific characters appear to be lacking. *Vidal 1814*, in Herb. Kew, which was mentioned by Stapf in the original description of *Quercus havilandii*[10] as possibly referable to the Bornean species, is almost certainly referable to the species here considered as *Q. jordanae*, but the specimen is without flowers and fruit, so that its absolute identification will always be more or less doubtful. I do not consider it to be the same as *Q. havilandii*. *Quercus caraballoana* F.-Vill., to which Vidal refers his No. 618bis, is surely the same as *Q. jordanae* (*Q. vidalii*), although the specimen does not appear to be extant, as I could not find it in the Kew herbarium. F.-Villar's description however applies very closely to the specimens above cited, while Vidal[11] states that it appeared to him to be very close to Laguna's species, giving only some trivial characters by which it could be distinguished. *Quercus sundaica* Bl., was admitted by me[12] on the strength of identifications made by O. Von Seemen, but Blume's species is quite different, its leaves having about 15 pairs of lateral nerves, while *Q. jordanae* has but 9 or 10 pairs. A specimen in the U. S. National Herbarium, *Lardizabal 7*, was identified at Berlin as *Quercus pruinosa* Blume, but this is a manifest error, as *Q. pruinosa* has quite different fruits, and differs from *Q. jordanae* in many other characters. The specimen determined by Von Seemen as *Quercus havilandii*,[13] *Loher 4873*, is not Stapf's species, but is the same as the other specimens from Lepanto and Benguet here referred to *Q. jordanae*.

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[10] Trans. Linn. Soc. Bot. II 4 (1894) *231, pl. 18, f. A.*

[11] Rev. Pl. Vasc. Filip. (1886) 265.

[12] *This Journal* 1 (1906) *Suppl.* 41.

[13] Perk. Frag. Fl. Philip. (1904) 42.

3. **Quercus llanosii** A. DC. Prodr. 16² (1864) 97, excl. syn. Blanco.

Q. companoana Vidal Sinopsis Atlas (1883) XLI, *t. 92, f. D;* Rev. Pl. Vasc. Filip. (1886) 280; Ceron Cat. Pl. Herb. (1892) 164; Koord. Meded. 's Lands Plantent. *19 (1898) 615 ?*

Q. sundaica F.-Vill. Nov. App. (1883) 207, excl. syn. Naves, fide Vidal; non Blume.

LUZON, without locality, *Llanos* in Herb. DeCandolle (type): Province of Cagayan, San Vicente, *For. Bur. 7086 Klemme,* May, 1907: Province of Rizal, Bosoboso, *Merrill 3680,* June, 1903; *Bur. Sci. 2100 Ramos,* February, 1907; Tanay, *Merrill 2344,* May, 1903: Province of Bataan, Lamao River, *For. Bur. 7368 Curran,* July, 1907. Local names *Maculab, Manloab, Bayucan, Catiban, Pagnan.*

I have examined the type of this species in the DeCandolle Herbarium, and also the type number of *Quercus companoana* Vidal at Kew, and although the type of *Quercus llanosii* is a flowering specimen with leaves 20 cm in length, and the type of *Q. companoana* is a specimen with immature fruits and with leaves 8 to 13 cm in length, I am disposed to consider the two species identical, and accordingly here reduce Vidal's species. The account of the fruit and Blanco's synonyms must be excluded from DeCandolle's description of the species, as *Quercus concentrica* Blanco appears to be referable to *Q. soleriana.* This may be the species determined by Blanco as *Quercus cerris,* as suggested by Vidal. Koorders has reported this species from Celebes, under *Q. companoana* Vidal.

4. **Quercus luzoniensis** sp. nov.

Arbuscula vel arbor parva subglabra; ramis teretibus, lenticellatis, ramulis glabris, nigricantibus; foliis alternis, coriaceis, integris, 4 ad 6 cm longis, oblongo-lanceolatis vel elliptico-lanceolatis, breviter acuminatis, basi acutis, supra nitidis, subtus glabris vel minutissime griseo-puberulis; cupulis circiter 1 cm diametro, utrinque cinereo-pubescentibus, squamulis imbricatis, acuminatis, adpressis, circiter 1.5 mm longis; glandibus conico-ovoideis, glabris, nitidis, apiculatis, circiter 1 cm altis crassisque.

A shrub or small tree about 6 m high, nearly glabrous. Branches terete, lenticellate, brownish, the branchlets somewhat angled, slender, glabrous, blackish when dry. Leaves alternate, oblong-lanceolate to elliptical-lanceolate, 4 to 6 cm long, 1.5 to 2.5 cm wide, the apex rather gradually short-acuminate, the base acute or slightly decurrent-acuminate, the margins entire, recurved, coriaceous, the upper surface glabrous, shining, the lower surface slightly paler, dull, glabrous or very minutely grayish-puberulent; nerves about 7 on each side of the midrib, obsolete or nearly so above, distinct beneath, the reticulations obsolete or nearly so; petioles about 5 mm long. Inflorescence unknown. Fruits in short spikes, terminal or in the upper axils; involucre about 7 mm high, abruptly narrowed below into a stout stalk, about 1 cm in diameter, rather densely gray-pubescent on both surfaces, the scales lanceolate, acuminate, alternate, imbricate, not arranged in concentric lines; glans ovoid-conical, glabrous, shining, about 1 cm high and the same in diameter, apiculate.

LUZON, Province of Benguet, Mount Tonglon, *For. Bur. 5040 Curran,* August, 1906 (type); Pauai, *Bur. Sci. 4411 Mearns,* July, 1907, sterile: Province of Zambales, Mount Tapulao, *For. Bur. 8081 Curran & Merritt,* December, 1907, sterile.

A species well characterized by its small coriaceous leaves and small fruits, the involucres being rather densely cinereous-pubescent. In leaf characters somewhat similar to *Quercus merrillii* Von Seem., but the fruits are entirely different.

§ CYCLOBALANUS.

5. **Quercus caudatifolia** sp. nov.

Arbor 17 ad 25 m alta; foliis oblongo-lanceolatis, 8 ad 14 cm longis, basi acutis, apice sensim caudato-acuminatis, acuminibus obtusis, supra glabris, subtus pallidioribus, junioribus plus minus cinereo-ferrugineo-puberulis, nervis utrinque circiter 10, subtus distinctis, reticulis subobsoletis; glandibus oblongo-conico-ovoideis, puberulis, 1.5 ad 2 cm longis, 8 ad 12 mm diametro; cupulis plus minus cinereo- vel ferrugineo-puberulis, circiter 7 mm altis.

A tree 17 to 25 m high. Branches terete, slender, ultimately glabrous, sparingly lenticellate, dark-reddish-brown to nearly black, the branchlets rather densely ferruginous-pubescent. Leaves alternate, oblong-lanceolate, subcoriaceous, 8 to 14 cm long, 2.5 to 4 cm wide, the base acute, the apex gradually narrowed to the rather slender, caudate, blunt acumen, the margins entire, the upper surface shining, glabrous, or when young very slightly pubescent, the lower surface paler, when young more or less ferruginous-cinereous-puberulent, especially along the midrib and nerves, apparently glabrous in age or nearly so; nerves about 10 on each side of the midrib, distinct beneath, obscurely anastomosing, the reticulations indistinct, nearly obsolete; petioles 5 to 10 mm long, usually pubescent. Female flowers spicately disposed, the spikes fascicled in the upper axils or arranged in terminal 5 to 7 cm long, panicles, ferruginous-pubescent. Glans oblong-conical-ovoid, 1.5 to 2 cm long, more or less puberulent, apiculate, 8 mm in diameter in the type, in other specimens 9 to 12 mm in diameter below. Cup about 7 mm high, including the thickened stipe, 10 to 12 mm in diameter, inclosing only the base of the glans, more or less ferruginous- or cinereous-pubescent outside, nearly glabrous within, the laminæ about 7, concentric, denticulate, the teeth very short, acute.

Type specimen from Lamao River, Mount Mariveles, Province of Bataan, Luzon, *For. Bur. 806 Borden*, May, 1904, at an altitude of about 700 m. I am disposed to refer here also the following specimens: *Elmer 6897*, November, 1904; *Whitford 276*, May, 1904, from the same locality: Province of Ilocos Sur, La Paz, *For. Bur. 5668 Klemme*, October, 1906: Province of Zambales, Botolan, *Merrill 2979*, June, 1903: Province of Rizal, Bosoboso, *Merrill 2702*, June, 1903: Province of Pangasinan, *For. Bur. 8277 Curran & Merritt*, December, 1907: Province of Camarines, *For. Bur. 10644 Curran*, June, 1908.

The species as here described is the Mariveles form, and some of the other specimens referred to it differ in some minor characters, in some specimens (*Curran 10644*), the leaves being quite glabrous. It is well characterized by its small fruits, which are considerably longer than thick. The species figured by Vidal in his Sinopsis, Atlas, *t. 92, f. A.*, as doubtfully representing *Quercus celebica* Miq., is probably referable here. It is certainly not Miquel's species. Local names: T., *Catabang, Bayucan;* Il., *Diraan, Dalutan.*

6. Quercus merrittii sp. nov.

Arbor circiter 18 m alta, glabra; foliis elliptico-lanceolatis, papyraceis, utrinque acuminatis, circiter 15 cm longis, integris, nitidis, nervis utrinque 9, subtus prominentibus, reticulis minutis, densis; glandibus conico-ovoideis, minute cinereo-puberulis, apiculatis, basi convexis, circiter 3 cm longis, 2 ad 2.2 cm diametro; cupulis 1.5 cm altis.

A tree about 18 m high, glabrous. Branchlets slender, terete or slightly angled, sparingly lenticellate, gray or reddish-brown. Leaves alternate, papyraceous, 13 to 15 cm long, 3.5 to 5 cm broad, the base somewhat decurrent-acuminate, the apex rather strongly caudate-acuminate, the acumen about 2 cm long, blunt, the margins entire, both surfaces rather pale when dry, somewhat shining; nerves 9 on each side of the midrib, prominent beneath, ascending, somewhat curved and very obscurely anastomosing, the reticulations very fine, dense, not prominent; petioles about 1 cm long. Flowers unknown. Glans conical-ovoid, minutely and deciduously cinereous-puberulent outside, the apex apiculate, the base convex, about 3 cm long, 2 to 2.2 cm in diameter; cup inclosing the basal fourth of the glans, including the stout stipe about 1.5 cm high, glabrous, or the outside minutely puberulent, the laminæ indistinct, 6 or 7, denticulate, the teeth very short.

LUZON, Province of Tayabas, Mount Banajao, *For. Bur. 8047 Curran & Merritt*, November, 1907, altitude 700 m.

This species is well characterized by its large fruits, its acorns being considerably larger than those of any other species known from the Philippines.

7. Quercus ovalis Blanco Fl. Filip. ed. 2 (1845) 502; A. DC. Prodr. **16**^{2} (1864) 97; F.-Vill. Nov. App. (1883) 208, *cum descript.!*; Vidal Rev. Pl. Vasc. Filip. (1886) 262; Ceron Cat. Pl. Herb. (1892) 164.

Q. glabra Blanco Fl. Filip. (1837) 727, non Thunb.

Q. blancoi A. DC. Prodr. **16**^{2} (1864) 97; Vidal Cat. Pl. Prov. Manila (1880) 42; Sinopsis Atlas (1883) XLI, *t. 92, f. C;* Rev. Pl. Vasc. Filip. (1886) 262, *cum descript.!;* Ceron Cat. Pl. Herb. (1892) 164; Koord. Meded. 's Lands Plantent. **19** (1898) 615.

Q. induta F.-Vill. Nov. App. (1883) 207, fide Vidal, non Blume.

Q. teysmanni F.-Vill. l. c., fide Vidal, non Blume.

LUZON, Province of Zambales, *For. Bur. 5817 Curran*, January, 1907: Province of Pampanga, Mount Abu, *Bur. Sci. 1909 Foxworthy*, January, 1907: Province of Bulacan, Angat, *For. Bur. 3235 Russell*, June, 1905: Province of Rizal, Bosoboso, *For. Bur. 10017 Curran*, February, 1908: Province of Batangas, Mount Malaraya, *For. Bur. 7847 Curran & Merritt*, November, 1907.

A very characteristic species, entirely glabrous or nearly so, with shining coriaceous leaves. Blanco's specific name *ovalis* is the earliest valid one available, and is here retained. *Quercus blancoi* A. DC., was based on *Q. glabra* Blanco, non Thunb., but *Q. ovalis* of the second edition of the Flora de Filipinas is manifestly *Q. glabra* of the first edition, Blanco having recognized his own error in referring Philippine material to Thunberg's species, simply proposed the new name *ovalis*, but did not indicate this. Vidal[14] has attempted to hold *Quer-*

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[14] Rev. Pl. Vasc. Filip. (1886) 262.

cus blancoi and *Q. ovalis* distinct, but this is inadmissable, as *Q. ovalis* and *Q. blancoi* are both only new names of the same species, *Q. glabra* Blanco, non Thunb., and are hence synonyms. I could not find the specimen in Herb. Kew, referred by Vidal to *Q. ovalis* (*Vidal 616bis*), but the specimens referred by him to *Q. blancoi* are identical with those cited above as representing the species. The specimen collected by Russell is a topotype, and was received under the same native name that Blanco cites, and agrees perfectly with his description, so I do not consider that there is the least doubt as to the identity of the species. Local names: T., *Uayan*, *Malabingao*.

8. **Quercus woodii** Hance in Journ. Bot. 12 (1874) 240; F.-Vill. Nov. App. (1883) 208.

LUZON, without locality, *Wood*, in Herb. Mus. Brit. (type): Province of Benguet, Baguio, *Williams 949, 980*, June, September, 1904; *Elmer 5900*, March, 1904.

The type of this species, which I have examined in the Herbarium of the British Museum, is very fragmentary, consisting of mature fruits and mere fragments of leaves, showing only the basal portions of two or three leaves. It is closely matched by Williams' specimens cited above. It is closely allied to *Quercus soleriana* Vidal, but has relatively much broader leaves, which are sometimes slightly repand above. Elmer's specimen was determined by Von Seemen as *Quercus pallida* Blume, but is quite unlike Blume's species, the type of which I have examined in Herb. Leiden. The leaves of *Quercus woodii* have but 9 or 10 pairs of lateral nerves, while those of *Q. pallida* Blume have about 15 pairs. Moreover the fruits are quite different, Blume's species being characterized by its very broad and flattened glans. *Q. pallida* is well figured by King in Ann. Bot. Gard. Calcutta 2 (1889) *pl. 53A*, and I have seen nothing closely approaching it from the Philippines.

9. **Quercus castellarnauiana** Vid. Rev. Pl. Vasc. Filip. (1886) 264; Ceron Cat. Pl. Herb. (1892) 165.

The type of this species was from the Island of Marinduque, *Vidal 1806*, locally known as *Puso-puso*. I am not at all sure that it belongs in this section, and it may be a species of the section *Pasania*, and allied to *Q. llanosii* A. DC.

10. **Quercus acuminatissima** sp. nov.

Quercus celebica Von Seem. in Perk. Frag. Fl. Philip. (1904) 41, non Miq.
Quercus philippinensis Merr. in For. Bur. Bull. 1 (1903) 16, non A. DC.

Arbor mediocriter, inflorescentiis, subtus foliis, ramulisque plus minus dense cinereo-ferrugineo-puberulis vel pubescentibus; foliis late oblongo-lanceolatis, 9 ad 17 cm longis, subcoriaceis, integris, basi acutis vel acuminatis, apice valde tenuiter acuminatis, supra brunneis, nitidis, glabris, subtus pallidioribus; glandibus conico-ovoideis, acuminatis, 1.8 ad 2.2 cm diametro, 1.5 ad 2 cm altis; cupulis extus dense ferrugineo- vel cinereo-pubescentibus, laminibus 8 ad 10, denticulatis.

A medium-sized tree, the branchlets, inflorescence, and lower surface of the leaves rather densely ferruginous- or cinereous-puberulent or pubescent. Branches terete, grayish- or reddish-brown, somewhat lenticellate, rugose, glabrous, the branchlets usually pubescent. Leaves alternate, broadly oblong-lanceolate, subcoriaceous, 9 to 17 cm long, 3 to 4.5 cm wide, entire, the base acute or somewhat acuminate, the apex strongly and slenderly acuminate, the acumen frequently 2 cm long, narrowed upwards to the blunt or acute point, the upper surface brown, shining, glabrous, the lower surface pale and densely ferruginous-cinereous-puberulent; nerves about 9 on each side of the midrib, distinct beneath, the reticulations obsolete; petioles glabrous or pubescent, about 1 cm long. Male inflorescence densely ferruginous-pubescent, in terminal panicles 7 to 15 cm long. Female inflorescence of solitary, axillary, pubescent spikes 7 to 11 cm long, the flowers solitary. Glans conical-ovoid, glabrous, shining, the base truncate, the apex acuminate, apiculate, 1.8 to 2.2 cm in diameter, 1.5 to 2 cm high; cup inclosing only the basal portion of the glans, saucer-shaped, densely ferruginous- or cinereous-puberulent outside, the laminæ 8 to 10, concentric, denticulate, the scales of the lower laminæ quite united, those of the upper less so.

MINDANAO, Province of Surigao, Placer, *Ahern 432*, February–May, 1901 (type) N. v., *Uyayan*. I am disposed to refer here also the following specimens, all from Mindanao: Maria Cristina Falls, *Mrs. Clemens 709*, October, 1906: Lake Lanao, Camp Keithley, *Mrs. Clemens 1176*, September, 1907: District of Zamboanga, Port Banga, *For. Bur. 9066, 9143, 9417 Whitford & Hutchinson*, November, 1907, to February, 1908.

This species was previously identified erroneously by me as *Q. philippinensis* A. DC., to which it is not at all closely allied, and later the same specimen was referred by Von Seemen to *Quercus celebica* Miq. It does not, however, appear to be very closely allied to Miquel's species, which was placed by DeCandolle in the section *Cyclobalanus*, and by King in the section *Pasania*. I am of the opinion that the present species is a *Cyclobalanus*, although the bracts of the upper laminæ are nearly free. It differs decidedly from *Quercus celebica* in being more pubescent, with larger fruits and very much more acuminate leaves. This species grows at lower altitudes than any other species known from the Philippines, occurring in the District of Zamboanga in dipterocarp forests at an altitude of from 20 to 30 m above the sea.

11. **Quercus solerlana** Vidal Rev. Pl. Vasc. Filip. (1886) 261; Ceron Cat. Pl. Herb. (1892) 164.

Quercus concentrica Blanco Fl. Filip. ed. 2 (1845) 502, non Lour.

Quercus molucca Blanco Fl. Filip. (1837) 726, non Rumph.

Quercus reinwardtii F.-Vill. Nov. App. (1883) 207, fide Vidal, non Korth.

Quercus costata var. *convexa* Naves Fl. Filip. ed. 3, *t. 441*, non Blume.

Quercus clementiana Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 41, non King.

Quercus llanosii Merr. in Philip. Journ. Sci. 2 (1907) 270, non A. DC.

LUZON, Province of Benguet, Twin Peaks, *Elmer 6443*, June, 1904: Province of Zambales, *For. Bur. 6811 Curran*, May, 1907: Province of Bulacan, Angat, *For. Bur. 11154 Aguilar*, April, 1908: Province of Rizal, Bosoboso, *For. Bur. 1148, 3258 Ahern's collector*, June, 1904, August, 1905; *Bur. Sci. 4659 Ramos*, August, 1907: Province of Batangas, *For. Bur. 7664 Curran & Merritt*, October, 1907: Province of Laguna, Santa Maria Mavitac, *For. Bur. 10101 Curran*, February, 1908: Province of Bataan, Mount Mariveles, *Elmer 6898*, November, 1904; *For. Bur. 2997 Meyer*, May, 1905; *Whitford 1178, 1180*, March, 1905; *For. Bur. 5458 Curran*, November, 1906; *Bur. Sci. 1598 Foxworthy*, October, 1906: Province of Tayabas, Unisan, *For. Bur. 1824, 1825 Klemme*, September, 1904. MINDORO, Mount Halcon, *Merrill 5695*, November, 1906; Mount Malasumbu, *For. Bur. 8586*, *8749 Merritt*, January, 1908; Mount Inauan, *For. Bur. 8721 Merritt*, January, 1908. MINDANAO, District of Davao, Todaya and Mount Apo, *Williams 2608, 3035*, April, July, 1905; *Copeland 1145, 1271*, April, 1904.

By far the most common and widely distributed species of the genus in the Philippines, and rather variable. Vidal's type is minutely matched by *Elmer 6443*, and by the specimens from Rizal Province cited above. *Quercus concentrica* Blanco non Lour., and *Q. molucca* Blanco non Rumph., are referred here, as Blanco's descriptions apply closely to the present species. *Quercus clementiana* was admitted by me on the strength of identifications made by Von Seemen, but an examination of authentic material of King's species, shows that it is distinct from *Q. soleriana*. The mature glans is about 2 cm long, and from 1.8 to 2.4 cm in diameter. Local names, T., *Hayopag*, *Alayan*, ex Blanco; *Cacaná* ex Vidal; *Basacan, Catabang;* Bogobo, *Ulaian;* Moro, *Ulan*.

12. **Quercus philippinensis** A. DC. Prodr. 16^2 (1864) 97; F.-Vill. Nov. App. (1883) 208; Vidal Phan. Cuming. Philip. (1886) 147; Rev. Pl. Vasc. Filip. (1886) 265; Ceron Cat. Pl. Herb. (1892) 165; Wenzig in Jahrb. Bot. Gart. Berlin 4 (1886) 231.

LUZON, Province of Tayabas, Mount Banajao, *Cuming 809*, type; *Elmer 8185*, May, 1907; *For. Bur. 7910, 7911 Curran & Merritt*, November, 1907; Mount Malaraya, *For. Bur. 7848 Curran & Merritt*, November, 1907: Province of Zambales, Mount Tapulao, *For. Bur. 8100 Curran & Merritt*, December, 1907.

This species is manifestly allied to *Quercus soleriana* Vidal, but is well characterized by its very prominently caudate-acuminate leaves. It appears to be rather local. King states that he can see no reason why this species should not be reduced to *Quercus lineata* Blume, of the section *Cyclobalanopsis*, but its leaves are entire, and recently collected material from the type locality shows it to have erect male spikes, and therefore to be a true *Cyclobalanus*. Wenzig l. c. states under *Q. philippinensis:* "*Q. llanosii* DC. N. 235, *Q. ovalis* Blanco fl. de filip. (ed. 2) p. 502, DC. N. 236, *Q. Blancoi* A. DC. N. 237 * * * sunt nonnisi formae *Q. philippinensis* DC.," but *Q. llanosii* is a species very distinct from *Q. philippinensis*, while *Q. blancoi* is an exact synonym of *Q. ovalis*, which is a species entirely different from both *Q. llanosii* and *Q. philippinensis*, as shown above.

13. **Quercus bennettii** Miq. Fl. Ind. Bat. 1^1 (1856) 857; DC. Prodr. 16^2 (1864) 94; King in Ann. Bot. Gard. Calcutta 2 (1889) 64, *pl. 584;* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 41.

Q. llanosii F.-Vill. Nov. App. (1883) 208; Vidal Sinopsis Atlas (1883) XLI, *t. 92, f. F.* ?, non A. DC.

Quercus wenzigiana Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 41, non King.

LUZON, Province of Bataan, Lamao River, Mount Mariveles, *Williams 705*, March, 1904; *Whitford 295, 365*, May, June, 1904; *For. Bur. 54 Barnes*, October, 1903; *For. Bur. 632, 685, 759, 781 Borden*, April, May, 1904; *For. Bur. 7224 Curran*, June, 1907; *Bur. Sci. 1572 Foxworthy*, October, 1906; *Leiberg 6052*, July, 1904: Province of Zambales, Masinloc, *Merrill 2941*, May, 1903: Province of Rizal, Antipolo, *Merrill 1709*, March, 1903: Province of Tayabas, *For. Bur. 1826 Klemme*, September, 1904.

Some of the specimens from the Province of Bataan were identified by Von Seemen as *Quercus bennettii* Miq., and others as *Q. wenzigiana* King, but they are manifestly all one species, and appear to me to be closer to *Q. bennettii* Miq., than to *Q. wenzigiana*. They are certainly very close to Maingay's Malacca specimen in Herb. Kew, referred by King to Miquel's species. Local names, T., *Bayucan, Basacan, Catibang, Palonapoy*.

Malacca, Borneo, and Bangka.

14. **Quercus merrillii** Seem. in Fedde Repert. 5 (1908) 21.

PALAWAN, Mount Pulgar, *For. Bur. 3857, 3858 Curran*, February, March, 1906; *Bur. Sci. 566 Foxworthy*, March, 1906.

A very distinct species, known only from Mount Pulgar.

§ CHLAMYDOBALANUS.

15. **Quercus cooperta** Blanco Fl. Filip. ed. 2 (1845) 503.

Castanopsis costata F.-Vill. Nov. App. (1883) 209, non A. DC.

Castanea cooperta Oerst. Vidensk. Selsk. Skr. V 9 (1873) 379.

Quercus fernandezii Vidal Sinopsis Atlas (1883) XLI, *t. 92, f. E.*; Rev. Pl. Vasc. Filip. (1886) 260.

The only specimen of this species that I have seen is *Vidal 617*, from Angat, Province of Bulacan, Luzon, in Herb. Kew, a topotype of Blanco's species. Although Blanco's description is very short, I can see no particular reason for displacing his specific name, which is here accepted. Vidal placed the species in the section *Lithocarpus*, but it appears properly to belong in the section *Chlamydobalanus*.

16. **Quercus reflexa** King in Ann. Bot. Gard. Calcutta 2 (1889) 78, *t. 72*.

MINDANAO, District of Davao, Todaya, *Copeland 1289*, April, 1904.

This very characteristic specimen agrees closely with King's description and figure of *Quercus reflexa*. It is well distinguished by its acorns being entirely inclosed by the cups, the latter being covered with short reflexed tubercles.

Borneo.

§ LITHOCARPUS.

17. **Quercus curranii** sp. nov.

Arbor circiter 20 m alta, ramulis densissime ferrugineo-tomentosis; foliis oblongis vel oblongo-ellipticis, subcoriaceis, 10 ad 12 cm longis, basi acutis, apice breviter obscureque acuminatis, integris, supra nitidis, subtus pallidioribus, plus minus ferrugineo- vel cinereo-pubescentibus; cupulis turbinatis, ferrugineo-pubescentibus, supra tuberculatis, vix zonulatis, 3 cm longis crassisque.

A tree about 20 m high. Branches terete, brownish, slightly pubescent, the branchlets very densely ferruginous-tomentose. Leaves oblong or oblong-lanceolate, subcoriaceous, entire, 10 to 12 cm long, 3 to 5 cm wide, the base acute, the apex shortly and obscurely acuminate, the upper surface brownish, shining, in age glabrous, when young somewhat pubescent, especially along the midrib, the lower surface pale, somewhat cinereous-pubescent, the midrib and lateral nerves ferruginous-pubescent; nerves 9 to 11 on each side of the midrib, prominent beneath, the reticulations obscure; petioles ferruginous-tomentose, about 1 cm long. Flowers unknown. Involucre turbinate, 3 cm high and 3 cm in diameter, narrowed from the upper third to the base, and with a stout 1 cm long stalk, rather densely ferruginous-pubescent, the lower two-thirds smooth, or with very few scattered spines above, the portion covering the top of the glans with numerous stout tubercles, which become more numerous and more densely disposed towards the apex, the upper third extending over the top of the glans and nearly inclosing it, leaving a circular ostiole 1 cm in diameter or less. Glans very hard, bony, the base and sides continuous, hemispherical, the top slightly convex, the apex depressed and apiculate, about 2 cm high and nearly 3 cm in diameter.

LUZON, Province of Laguna, Mount Banajao, *For. Bur. 7917, 7918 Curran & Merritt*, November, 1907, in forests at an altitude of from 800 to 900 m.

A very characteristic species, and the only one of the section known from the Philippines, allied to *Quercus rotundata* Bl., of Java, and to *Q. pulchra* King, of Borneo, but very distinct from both. It is the species of which Vidal figured the fruits as *Quercus* sp., Sinopsis Atlas (1883) XLI, *t. 92, f. G.*, and which also came Mount Banajao, at an altitude of about 1000 m.

DOUBTFUL AND EXCLUDED SPECIES.

QUERCUS CERRIS Blanco Fl. Filip. (1837) 727; ed. 2 (1845) 503, non Linn.

It is quite impossible to determine what species Blanco had in mind, from his very short and imperfect description. It is possible that it is the same as *Quercus llanosii* A. DC.; it is, of course, not at all the European species.

The following note from Blanco's discussion of this imperfectly described species, throws much light on his methods of botanizing: "It is truly lamentable that for the lovers of the study of nature, neither prayers, supplications nor money suffice to bring to knowledge the precious things of the Philippine forests."

QUERCUS NITIDA Von Seem. in Perk. Frag. Fl. Philip. (1904) 42, non Blume.

The specimen, *Merrill 1115*, at least the one before me, is a mixture, the fruits, picked up from the ground, being very similar to those of *Q. reflexa* King, but the leaves are manifestly those of *Parinarium* (*Rosaceæ*) well characterized by the glands at the base of the lamina. *Quercus nitida* Blume is a doubtful species, and the above specimen, so far as it is a *Quercus*, does not seem to be at all allied to it.

QUERCUS CASTELLARNAUIANA Merr. in For. Bur. Bull. 1 (1903) 16; Von Seem. in Perk. Frag. Fl. Philip. (1904) 41, non Vidal.

This is an undeterminable form, as noted by Von Seemen, with flowers only. It is not Vidal's species.

The only clue we have to the numerous species credited to the Philippines in the Novissima Appendix by F.-Villar, is Vidal's notes.[15] Those accounted for by Vidal have been treated above according to the disposition Vidal made of them. It seems probable that of the nineteen species admitted by F.-Villar, none of those originally described from extra-Philippine material were correctly identified. Eight species were unaccounted for by Vidal, and it does not seem to be worth while to enter into any further consideration of them, as there are no specimens extant, and their identification would be only a matter of guesswork.

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[15] Rev. Pl. Vasc. Filip. (1886) 260–265.

THE GENUS RADERMACHERA HASSK IN THE PHILIPPINES.

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The Philippine history of this genus begins with the publication of Blanco's "Flora de Filipinas" in 1837, in which two species are inadequately described, *Millingtonia pinnata* Blanco and *Millingtonia quadripinnata* Blanco. The descriptions of both are imperfect, and both species have been variously interpreted by later authors. The descriptions are repeated in the second and third editions of Blanco's work, without change of name. In 1861, Bureau described *Radermachera banaibana* in Adansonia **2**:194, based on a specimen in the Paris herbarium collected at Calauan, Province of Laguna, Luzon, by Callery. This species is manifestly the same as the one described by Blanco as *Millingtonia pinnata* and was so considered by Seemann in his Revision of the Natural Order Bignoniaceae,[1] where Blanco's *Millingtonia pinnata* is transferred to *Radermachera* as *R. pinnata* (Blanco) Seem., Bureau's *Radermachera banaibana* being reduced as a synonym. At the same time Seemann also transferred Blanco's *Millingtonia quadripinnata* to *Radermachera*, as *R. quadripinna*, and referred to it a specimen collected in the Philippines by Cuming (no. 996). In 1883, F.-Villar[2] transferred Blanco's two species of *Millingtonia* to *Stereospermum*, as *S. pinnatum* and *S. quadripinnatum*, while Naves figured a plant that he identified with *Millingtonia quadripinnata* Blanco in the third edition of Blanco's Flora de Filipinas, *t. 252*. In this same year Vidal[3] also figured a plant that he identified as *Stereospermum quadripinnatum* F.-Vill., which although poorly and imperfectly drawn, is, I am confident, identical with the plant determined by F.-Villar as *Stereospermum quadripinnatum*, and which, whether or not it is Blanco's *Millingtonia quadripinnata*, is certainly the plant he described as *M. pinnata*.

In 1884, Rolfe[4] considered the Philippine species of *Stereospermum*, recognizing four species, *S. quadripinnatum* (Blanco) F.-Vill., the form so identified by F.-Villar and Vidal, *S. pinnatum* (Blanco) F.-Vill., to which is referred a specimen collected by Cuming (no. 1517), which is certainly not the same as the plant Blanco described, *S. banaibanai* (Bureau) Rolfe, and *S. seemannii* Rolfe, the latter described as new, based on *Cuming 996*, a very fragmentary specimen, which had been referred by Seemann to *Radermachera quadripinna.* Vidal[5] follows Rolfe in his consideration of the Philippine species of the genus. In 1905, the present author described *Radermachera elmeri*, and in the following year, *R. biternata*, this being a history of the Philippine forms up to the present time.

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[1] Journ. Bot. 8 (1870) 147.
[2] Nov. App. 151.
[3] Sinopsis Atlas *t. 73, f. A.*
[4] Journ. Linn. Soc. Bot. 21 (1884) 313-315.

The difficulty has been to determine just what the plants were that Blanco described, and from an examination of his descriptions, both of which are imperfect, the conclusion has been reached that both of Blanco's descriptions apply to only one species, for which the earlier name *pinnata* is here adopted, although none of the specimens so identified have pinnate leaves, and no specimens seen from the Philippines have 4-pinnate leaves. The local name, *Banaibanai*, is almost invariably applied to the form below considered to represent *Radermachera pinnata* (Blanco) Seem., and is one of the names cited by Blanco. The other native name cited by Blanco, *Botong manoc*, meaning "chicken bone," is of little value in establishing the identity of the species, as it is applied indiscriminately by the natives to a number of totally different trees. The only native name cited by Blanco under *Millingtonia quadripinnata*, is *Baticulin*, but this name is almost invariably applied to various arborescent *Lauraceae* at the present time.

Nine species of *Radermachera* are recognized in the following paper, considerably more than is known from all other regions combined. In my treatment of the older species, based on Blanco's two Millingtonias, I am at considerable variance with Seemann, and entirely at variance with Rolfe, in my conception as to what Blanco really intended to describe, but my conclusions have been based on considerable field knowledge, extending over a period of six years, as well as a very extensive series of specimens from all parts of the Philippines, and especially rich in individual collections from the provinces about Manila, from which Blanco received most of the material on which his Flora de Filipinas was based.

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[5] Phan. Cuming. Philip. (1885) 132; Rev. Pl. Vasc. Filip. (1886) 203.

KEY TO THE SPECIES

Calyx strongly longitudinally ribbed; leaves pinnate 1. *R. coriacea*
Calyx smooth, not ribbed; leaves various.
Leaves simply pinnate 2. *R. elliptica*
Leaves bi-ternate 3. *R. biternata*
Leaves bi- or tripinnate.
Corolla 4 to 6.5 cm long.
Corolla campanulate, usually broadly so.
Flowers about 6 cm long 4. *R. elmeri*
Flowers 4 to 4.5 cm long.
Leaflets obtuse, or shortly and obtusely acuminate 5. *R. fenicis*
Leaflets slenderly long acuminate 6. *R. acuminata*
Corolla tubular, 5.5 cm long, the limb spreading 7. *R. palawanensis*
Corolla 3 cm long or less.
Rachises of the panicles and leaves not lenticellate; flowers 2.5 to 3 cm long.
Panicles pubescent 8. *R. pinnata*
Panicles glabrous 8. *R. pinnata glabra*
Rachises of the panicles and leaves usually strongly lenticellate; corolla less than 2 cm long 9. *R. mindorensis*

1. **Radermachera coriacea** sp. nov.

Arbor glabra, foliis pinnatis, 20 ad 30 cm longis; foliolis 5, coriaceis, supra nitidis, oblongis vel elliptico-oblongis, 7 ad 14 cm longis, basi acutis, apice obtusis vel obscure obtuseque acuminatis, marginibus recurvatis; floribus 4 cm longis, calycibus 1.8 cm longis, fissis, valde longitudinaliter costatis, angustatis; fructibus 16 cm longis.

A tree, glabrous throughout. Branches terete, brown, densely lenticellate. Leaves pinnate, 20 to 30 cm long; leaflets 5, oblong or elliptical-oblong, 7 to 14 cm long, 3 to 4 cm wide, firmly coriaceous, the upper surface very shiny, the lower slightly paler and somewhat shining, densely punctate-glandular, the base acute, the apex obtuse or shortly and obscurely blunt-acuminate, the margins rather strongly recurved; nerves about 13 on each side of the midrib, anastomosing, slightly more distinct than are the rather lax reticulations; petiolules of the lateral leaflets about 1 cm long, that of the terminal leaflet 2.5 cm long. Panicles at least 15 cm long. Calyx 1.8 cm long, narrow, strongly longitudinally costate with 5 or 6 ridges, cleft down one side nearly to the middle, 3-toothed at the apex. Corolla 4 cm long, the tube rather narrow, slightly enlarged above, the lobes about 1 cm long, obtuse. Fruit 16 cm long, the valves 5 to 7 mm wide, shining, coriaceous, glabrous, blunt or acuminate at the apex; seeds unknown.

LUZON, Province of Tayabas (Principe), Baler, *Merrill 1099*, September, 1902, N. v., *Bibit parang*.

A very characteristic species, not only in its simply pinnate leaves and very coriaceous leaflets but also in its cleft and strongly ridged calyx. It is the only known Philippine species possessing the latter character.

2. **Radermachera elliptica** sp. nov.

Arbor glabra; foliis pinnatis, circiter 35 cm longis; foliolis 5, ellipticis vel obovato-ellipticis, usque ad 15 cm longis, basi acutis vel acuminatis, apice late rotundatis vel breviter obtuseque acuminatis, nervis utrinque 9; paniculis axillaribus, circiter 15 cm longis, densis; floribus 5 cm longis, calycibus 2 cm longis, obliquis, junioribus clausis; fructibus 20 ad 25 cm longis.

A tree, glabrous throughout. Branches terete, brown, strongly lenticellate. Leaves simply pinnate, about 35 cm long: leaflets 5, elliptical or obovate-elliptical, 12 to 15 cm long, 7 to 9 cm wide, coriaceous, shining, the base acute or somewhat acuminate, the apex broad, rounded, or very shortly and broadly obtusely acuminate; nerves about 9 on each side of the midrib, distinct, anastomosing, the reticulations lax; petiolules about 1.5 cm long, that of the terminal leaflet short, but the rachis produced about 5 cm beyond the upper pair of leaflets. Panicles axillary, about 15 cm long, peduncled, densely flowered, more or less resinous and shining. Flowers white. Calyx about 2 cm long, closed in bud, obliquely split in anthesis, not toothed, submembranaceous, smooth, not at all ridged. Corolla 5 cm long, the tube somewhat abruptly enlarged where it emerges from the calyx, about 1.5 cm in diameter above, the lobes broadly ovate, rounded, 1 cm long, somewhat hairy inside at the insertion of the anthers; filaments glabrous. Capsules 20 to 25 cm long, nearly cylindrical, slightly compressed, glabrous, shining, 7 to 8 mm in diameter, the apex somewhat acuminate; seeds numerous, including the wings 1.3 cm long.

LUZON, Province of Bulacan, Angat, *For. Bur. 11141 Aguilar*, April, 1908.

Well characterized by its pinnate leaves, elliptical coriaceous leaflets, and large flowers. Not closely allied to any other known Philippine species.

3. **Radermachera biternata** Merr. in Philip. Journ. Sci 1 (1906) Suppl. 238.

CULION, *Merrill 568*, December, 1902. BUSUANGA, *For. Bur. 3491 Curran*, December, 1905.

The only known species of the genus with biternate leaves.

4. **Radermachera elmeri** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 48.

LUZON, Province of Benguet, Sablan, *Elmer 6179* (type), April, 1904: Province of Cagayan, *Bolster 134*, July 15, 1905. PALAWAN, Balsajan River, *Bur. Sci. 584 Foxworthy*, March, 1906; Cabudlungan, *For. Bur. 5190 Curran*, August, 1906. N. v., *Agtap*, in Palawan.

This species is well characterized by its very large flowers, those in the type being 6 cm long, and, according to the collector, pink in color, while those of Bolster's specimen are 6.5 cm long and said by him to be white and more or less yellow inside. The Palawan specimens differ from the type in having somewhat smaller flowers (5.5 cm), which are said by Foxworthy to be white and fragrant. I can not, however, find any valid characters in the material at hand to warrant the separation of any of the above as distinct species, although additional material may show such a course to be desirable.

5. Radermachera fenicis sp. nov.

Arbor parva, usque ad 5 m alta, glaberrima; foliis 15 ad 20 cm longis, bipinnatis, 3-jugatis; foliolis oblongo-ellipticis vel anguste obovato-ellipticis, 4 ad 5 cm longis, subtus minutissime punctatis, apice acutis, obtusis, vel breviter obtuseque acuminatis, basi cuneatis; paniculis terminalibus folia aequantibus, angustis; floribus albis, 4 cm longis; fructibus circiter 11 cm longis.

A small tree 3 to 5 m high, glabrous throughout. Branches terete, grayish-brown, lenticellate. Leaves opposite, about 20 cm long, the lowest pinnæ 3-foliolate, the others of single leaflets: leaflets oblong-elliptical to obovate-elliptical, 4 to 5 cm long, 1.5 to 3 cm wide, rather thin, shining, the apex obtuse, acute, or somewhat acuminate, the base cuneate, the lower surface minutely punctate; lateral primary nerves about 7 on each side of the midrib, anastomosing, scarcely more distinct than are the secondary nerves and reticulations; petiolules 5 mm long or less, that of the terminal leaflet 1 to 1.5 cm long. Panicles terminal, narrow, about as long as the leaves, the bracteoles linear-setaceous, about 4 mm long. Flowers white. Calyx somewhat campanulate, epunctate, 1 cm long, 2-lobed, one lobe with two, the other with three small teeth. Corolla about 4 cm long, the first 5 mm slender, tubular, then abruptly enlarged and campanulate, 3 cm wide above, the lobes broad, rounded. Stamens glabrous. Capsules somewhat compressed, about 11 cm long, 6 mm thick, glabrous; seeds many, 3 mm wide, and, including the wings, 1 cm long, apiculate.

BATAN (Batanes Islands), Santo Domingo de Basco, *Bur. Sci. 3583 Fenix*, May, 1907. N. v., *Balaybayan.*

A species well characterized by its small leaves, comparatively short capsules, and its blunt, acute, or only shortly acuminate leaflets. I am disposed to refer here an imperfect specimen from Mindoro, *For. Bur. 9750 Merritt*, but when more and better material is secured, the Mindoro plant may be found to present characters sufficient to warrant its description as a distinct species. It has much more acuminate leaves than has the Batan plant.

6. Radermachera acuminata sp. nov.

Stereospermum quadripinnatum Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 313; *nec Millingtonia quadripinnata* Blanco, *nec Radermachera quadripinna* Seem.

Arbor glabra; foliis bipinnatis, circiter 40 cm longis: foliolis oblongo-lanceolatis vel lanceolatis, coriaceis, basi acutis, apice valde acuminatis, usque ad 13 cm longis; paniculis terminalibus circiter 25 cm longis; floribus circiter 4 cm longis, campanulatis.

A tree, glabrous throughout, or the inflorescence obscurely puberulent. Leaves bipinnate, about 40 cm long, the lowermost pinnæ with 5 leaflets, the next with 3 leaflets, and the upper ones simple: leaflets oblong-lanceolate or lanceolate, 8 to 13 cm long, 2.5 to 4.5 cm wide, the base acute, the apex slenderly long-acuminate, coriaceous, slightly shining; lateral nerves about 12 on each side of the midrib, not prominent, anastomosing, the reticulations fine, indistinct; petiolules 8 to 12 mm long,

that of the terminal leaflet 2.5 cm long. Panicles terminal, about 25 cm long, the primary branches about 5 cm long, many-flowered. Flowers crowded at the ends of the panicle-branches. Calyx closed in bud, in anthesis campanulate, about 1 cm long, 2-lobed. Corolla 4 cm long, the portion within the calyx slender, tubular, then abruptly enlarged and campanulate, about 2 cm wide, the lobes rounded, broad. Capsules unknown.

GUIMARAS, *For. Bur. 277 Gammill*, January, 1904.

I do not hesitate to refer here *Cuming 1003*, which Rolfe considered to represent Blanco's *Millingtonia quadripinnata*, but which is certainly not Blanco's species. I am disposed to refer here also an immature specimen from Masbate, *Whitford 1696*, and also a very fragmentary specimen from Mount Abu, Pampanga Province, Luzon, *Foxworthy 1949*. The exact locality of Cuming's specimen cited above is unknown, Rolfe stating it as Province of Albay, Luzon, but Cuming's list at Kew giving this number as from the Province of Pangasinan.

7. **Radermachera palawanensis** sp. nov.

Arbuscula subglabra; ramulis, rhachidibus, paniculisque sparse pubescentibus; foliis circiter 20 cm longis, bipinnatis; foliolis oblongo-ellipticis vel lanceolato-ellipticis, coriaceis, nitidis, 3.5 ad 8 cm longis, basi acutis, apice acuminatis, margine revolutis; paniculis folia aequantibus, laxis, paucifloris; floribus albis, 5 ad 5.5 cm longis; corollae tubo cylindraceo.

A shrub, nearly glabrous, or the branches, rachises of the leaves, and panicles slightly pubescent. Leaves about 20 cm long, bipinnate, the lowest pair of pinnæ with 5 leaflets, the next with 3 leaflets, the upper ones simple: leaflets oblong-elliptical or lanceolate-elliptical, 3.5 to 8 cm long, 1 to 2.5 cm wide, coriaceous, glabrous, shining on both surfaces, the margins rather strongly recurved, the base acute, the apex more or less acuminate, sometimes apiculate, and rarely with one or two irregular teeth at the apex; lateral nerves about 8 on each side of the midrib, not very distinct, anastomosing; petiolules of the lateral leaflets 3 to 8 mm long, that of the terminal one longer. Panicles as long as the leaves, lax, few-flowered. Flowers white. Calyx subcylindrical, narrowed below, obscurely lobed, about 1 cm long. Corolla 5 to 5.5 cm long, the portion within the calyx very slender, tubular, then abruptly enlarged, forming a broader tubular portion 2 to 2.5 cm long, the limb spreading, about 3 cm in diameter, the lobes broad, rounded. Capsules very slender, about 20 cm long, the valves at least 3 mm wide; seeds unknown.

PALAWAN, Victoria Peak, *Bur. Sci. 699 Foxworthy*, March 23, 1906, on rocky slopes along a river at 1,000 m altitude.

8. **Radermachera pinnata** (Blanco) Seem. in Journ. Bot. 8 (1870) 147.

Millingtonia pinnata Blanco Fl. Filip. (1837) 501; ed. 2 (1845) 351; ed. 3, 2: 285; Miq. Fl. Ind. Bat. 2 (1856) 753.

Millingtonia quadripinnata Blanco l. cc. 499, 351, 286; Miq. l. c.

Radermachera banaibana Bur. in Adansonia 2 (1861) 194; Seem. in Journ. Bot. 8 (1870) 147; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 124.

Stereospermum banaibanai Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 314; Vidal Rev. Pl. Vasc. Filip. (1886) 203; Phan. Cuming. Philip. (1885) 132.

Stereospermum seemannii Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 314; Vidal l. cc. 132, 203.

Stereospermum quadripinnatum F.-Vill. Nov. App. (1883) 151; Vidal Sinopsis Atlas (1883) *t. 73, f. A* (inaccurate).

Radermachera quadripinna Seem. in Journ. Bot. 8 (1870) 147.

Stereospermum pinnatum F.-Vill. Nov. App. (1883) 151.

LUZON, without locality, *Cuming 1182, 996*: Province of Benguet, Sablan, *Elmer 6157*, April, 1904: Province of Zambales, *For. Bur. 5800 Curran*, January, 1907; *For. Bur. 6084 Aguilar*, January, 1907; Botolan, *Merrill 2925*: Province of Pangasinan, Salasa, *For. Bur. 9628 Zschokke*, December, 1907: Province of Rizal, Montalban, *Loher 4323*, March, 1891; Antipolo, *Merrill 1729*, March, 1903: Province of Bataan, Mount Mariveles, *Whitford 24*, April, 1904; *For. Bur. 725, 1540, 1541, 1550, 1542, 1566 Borden; For. Bur. 342, 185, 548 Barnes; For. Bur. 2424 Meyer*, January, 1905; *Williams 588*, February, 1904: Province of Camarines Sur, *Ahern 61*, February, 1902. MINDORO, *For. Bur. 9717 Merritt*, February, 1908.

Var. **glabra** var. nov.

Differt a typo omnibus partibus glabratis.

LUZON, Province of Rizal, Bosoboso, *For. Bur. 2671 Ahern's collector*, January, 1905 (type); Antipolo, *For. Bur. 469 Ahern's collector; Dec. Philip. For. Fl. 174; Loher 4322*, March, 1903: Province of Bataan, Mount Mariveles, *For. Bur. 2469 Borden*, January, 1905; *Bur. Sci. 5177 Foxworthy*, April, 1908: Province of Cagayan, *For. Bur. 6660, 11303 Klemme*, April, 1907, 1908: Province of Isabela, Casiguran, *Bur. Sci. 3121 Mearns*, June, 1907. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 274*, February, 1906.

This is the most common and widely distributed species of the genus in the Philippines, being somewhat variable, and its synonomy is rather complicated, due primarily to Blanco's imperfect descriptions, and to various later interpretations of these. The leaves are bi- and tripinnate, frequently on the same specimen, and the flowers vary in size from 2.5 to 3 cm in length, but on all the specimens cited above, both under the species and the variety, the flowers are uniformly described by the collectors, as far as the field notes show, as pink or pale purple and marked with yellow inside.

I have adopted the first valid specific name available, taken from *Millingtonia pinnata* Blanco, although so far as I have observed, and in the large series of specimens examined, the leaves are never simply pinnate. It is universally known to the natives as *Banaibanai*, a name normally applied to no other species, other than the following one, and with the exception of the discrepancy as to leaves, Blanco's description applies very closely. The species is very abundant in the regions from which Blanco received most of his material. The disposition of Blanco's *Millingtonia quadripinnata* necessitated careful consideration, but I have here reduced it to *Radermachera pinnata* (Blanco) Seem., although in this I am at variance with both Seemann and Rolfe, who have previously worked over the Philippine species of this genus. Knowing thoroughly the flora of the region about Manila, and the contiguous provinces, it does not seem probable that this species, if distinct from *R. pinnata*, as considered by Blanco, should have escaped our notice, but up to the present time there is nothing in our herbarium to which Blanco's description applies so well as to the material here considered to represent *Radermachera pinnata*. It seems rather curious that Blanco should have described it under two different names, neither of which apply well to the species, for none of the above specimens have simply pinnate leaves, and none have quadripinnate ones, all having bi- or tripinnate leaves or both. Blanco's work shows internal evidence that the various species were described from time to time, in a period extending over many years, sometimes from fresh material, at other times from dried specimens brought or sent to him by various persons. It seems very evident, moreover, that he had no herbarium, so that the probability of repetitions was thereby increased.

As to *Sterrospermum seemannii* Rolfe, after an examination of several specimens of each of the numbers secured by Cuming, including the type of *S. seemannii*, I can see no reason for separating it from *Radermachera pinnata*. The type, *Cuming 996*, and such duplicates of the type number as I have seen, one of which is before me, are very fragmentary, with detached leaflets and badly insect eaten flowers, and appear to be in all respects the same as Blanco's species.

9 **Radermachera mindorensis** sp. nov.

Stereospermum pinnatum Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 314; Vidal Rev. Pl Vasc. Filip. (1886) 203, not *Millingtonia pinnata* Blanco.

Stereospermum quadripinnatum Naves in Fl. Filip. ed. 3, *t 252?*

Arbor glabra, usque ad 20 m alta; foliis tripinnatis, rariter bipinnatis, 40 ad 50 cm longis; foliolis lanceolatis vel oblongo-lanceolatis, basi acutis, apice caudato-acuminatis, chartaceis, 8 ad 11 cm longis; paniculis terminalibus, diffusis, folia aequantibus vel longioribus; floribus circiter 1.5 cm longis.

A tree glabrous throughout, about 20 m high. Branches terete, brown or gray, lenticellate. Leaves tripinnate, rarely bipinnate, 40 to 50 cm long, the rachis lenticellate; leaflets lanceolate or oblong-lanceolate, chartaceous, somewhat shining, 8 to 11 cm long, 2 to 3.5 cm wide, the base acute or somewhat acuminate, the apex slenderly caudate-acuminate, the acumen about 2 cm long, acute; nerves about 12 on each side of the midrib, anastomosing, slightly more distinct than are the secondary ones and reticulations; petiolules of the lateral leaflets about 5 mm long, those of the terminal leaflets 1 to 2 cm long. Panicles terminal, glabrous, diffuse, equaling or longer than the leaves, the rachis frequently lenticellate. Flowers light-purple. Calyx somewhat campanulate, 4 to 5 mm long, closed in bud, in anthesis shortly and irregularly 3- to 5-toothed. Corolla 1.5 to 1.8 cm long, the portion within the calyx slender, tubular, then abruptly enlarged and tubular-campanulate, somewhat pubescent on the outside, irregularly lobed. Capsules 45 cm long, 4 to 5 mm in diameter, somewhat compressed; seeds, including the wings, about 13 mm long.

MINDORO, Calapan, *Merrill 893* (type), April, 1903; Pola, *Merrill 2240, 2473*, May, June, 1903; Bongabong River, *Whitford 1387*, January, 1906; Baco River, *McGregor 257*, April, 1905, with larger flowers than the type; Bongabong, *Hickman s. n.*

Allied to the preceding species, but with much more diffuse panicles, and much smaller flowers. I am disposed to refer here *Cuming 1517*, which was from the Island of Mindoro, according to Cuming's list at Kew, not from Batangas Province, Luzon, according to the labels on some of the specimens. It was referred by Rolfe to *Stereospermum pinnatum* F.-Vill., but the sheet at Kew, which I have examined, has at least bipinnate leaves, and not pinnate ones as stated by Rolfe, and is certainly not the same as *Millingtonia pinnata* Blanco.

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THE PALMS OF THE BATANES AND BABUYANES ISLANDS.

By O. BECCARI.

(*Florence, Italy.*)

PHOENIX Linn.

Phoenix Hanceana Naudin var. **philippinensis** Becc. var. nov.

Batanes, Sabtan Island, *Bur. Sci. 3744 Fénix,* June, 1907, growing along streams well up on the mountains, the specimen in fruit. The leaves are used by the natives for making raincoats. N. v., *Vovavoy.*

Phoenix Hanceana Naudin was previously considered by me[1] to be only a variety of *Ph. humilis* Royle, and indeed it is difficult to find good characters in the reproductive organs for specifically separating the two, but apparently *Ph. Hanceana* differs from the various Indian forms of *Ph. humilis* (except perhaps from the variety *robusta*) in its shorter and more robust stem, and its leaves with more approximate and, in their terminal part, more regularly arranged leaflets. It may be considered convenient to consider *Ph. Hanceana* as at least a geographical species, as it occurs, with slight variations in its most important characters, along the shores of southern China, in Formosa, and in the most northern part of the Philippines.

From what I can judge by inspection of the specimens at my disposal, the Philippine variety of *Ph. Hanceana* differs from the Chinese by having its perianth more distinctly and more deeply cyathiform and consequently covering a larger portion of the base of the fruit, and in the corolla slightly more than twice as long as the calyx. (In the Chinese form the perianth is shortly cupular and covers one-fifth of the entire fruit and the corolla is about twice as long as the calyx). In **Ph. Hanceana** from Formosa (var. **formosana** Becc.) the corolla is almost three times as long as the calyx, which is shortly cupular; of this last variety I have not seen the fruit.

Phoenix Hanceana var. *philippinensis* offers the following chief characters: the stem is given by the collector as 1 to 2 m high and 45 cm in circumference

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[1] Malesia 3: 392.

(when it is covered with the bases of the leaf-stalks ?). Leaves about 1 m in length; leaflets in the lower portion of the leaf markedly fascicled and pointing in different directions, more regularly set and more approximate in the terminal part, rigid, narrowly but distinctly lanceolate, with dull, not shining, surfaces, when dry. Fruiting perianth distinctly cyathiform, covering one-fourth part of the entire fruit, the corolla slightly more than twice as long as the calyx, the petals with a narrow and slightly scarious margin. Fruit ovoid-oblong, 15 to 18 mm long, about 9 mm thick, apparently black when quite mature, distinctly mucronate; seed 10 to 12 mm long, 5.5 to 6 mm thick.

ARECA Linn.

Areca Catechu Linn.

Batanes, Batan Island, Santo Domingo de Basco, *Bur. Sci. 3834 Fénix*, June, 1907, N. v., *Dapiau*.

PINANGA Blume.

Pinanga Barnesii Becc.

Babuyanes, Camiguin Island, *Bur. Sci. 4144 Fénix*, June, 1907. Known also from Luzon and Mindoro.

Pinanga batanensis Becc. sp. nov.

Inter majores, 6–7 m alta, caudice robusto. Folia 2 m longa et ultra, regulariter pinnata, petiolo brevissimo; segmenta numerosa, chartaceo-rigida, utrinque opaca subtus pallidiora, ibique minutissime punctulata, recta, ensiformia, in acumen longissimum non falcatum sensim attenuata, inferiora bicostata, intermedia unicostata, geminata, sive per paria valde approximata, circiter 80 cm longa et in eorum dimidiam inferiorem partem 2.5–3 cm lata, basi parum attenuata, ibique abrupte reduplicato-plicata; costa media validissima, supra 3 mm elevata, sublaminari, acuta, subtus dense squamuloso-furfuracea; segmenta superiora sensim minora, singulatim alterna et aequidistantia (non geminata), apice breviter bidentata, terminalia ceteris minora, linearia. Spadix circiter 50 cm longus, parte pedicellari crassa brevissima praeditus, ramulis numerosis (minus 15), irregulariter spiraliter insertis, crassis, compressis, 25–30 cm longis, in sicco 5–6 mm latis, prope apicem parum attenuatis; florum glomerulis regulariter biseriatis. Flores ♂ pro rata majusculi, crassi, asymetrice trigoni, 12–15 mm longi, 8–10 mm lati; calyce parvo, acute 3-dentato, partem basilarem corollæ tantum vestiente; petalis coriaceis, subdeltoideis, acutis; staminibus circiter 40. Fructus concinne biseriato-pectinati, late ovoidei, vertice abrupte breviterque conico, 2 cm longi, 12 mm crassi; semine late ovoideo, apice obtuso, basi vix vel obtuse et brevissime caudiculato, profunde crebreque radiatim ruminato. Perianthium fructiferum depresse lateque concavo-cupulare (in ore minime constrictum), 7 mm latum, 2.5 mm altum, divisionibus in margine rotundatis nec in medio apiculatis.

Batanes Islands, Batan, Santo Domingo de Basco, *Bur. Sci. 3841 Fénix*, June, 1907, growing along mountain streams.

This is one of the largest species of the genus, apparently related to *Pinanga insignis* Becc., but the present species has larger, equidistant, and always solitary (never geminate) leaflets, and larger fruits.

Pinanga Elmerii Becc.

Babuyanes, Camiguin Island, *Bur. Sci. 4149 Fénix*, July, 1907.

Pinanga urosperma Becc. sp. nov.

Mediocris, 4–5 m alta. Folia circiter 1.6 m longa, regularissime pinnata, segmentis numerosissimis (utrinque circiter 40), aequidistantibus, angulo nonnihil acuto insertis, chartaceis, rigidulis, utrinque opacis, subtus pallidioribus et minutissime punctulato-subscabridulis, unicostatis, angustis, elongatis, in apicem acuminato-caudatum leviter falcatum sensim a medio acuminatis, basi parum attenuatis, costa media valida subtus squamulis ferrugineis demum deciduis dense obtecta percursis; segmentis medialibus 50–55 cm longis, infra medium usque ad 20–22 mm latis, superioribus sensim brevioribus et paullo angustioribus, 2 vel 3 terminalibus ceteris brevioribus et 2–4-costatis. Spadix brevis, 25 cm longus, parte pedicellari brevi, 10–12 mm crassa, suffultus; ramulis paucis (5), alterne distichis, crassis, compressis, 12–14 cm longis, in sicco 5–6 mm latis, apice non vel vix attenuatis. Fructus concinne biseriato-pectinati, valde inter se approximati, ovoideo-elliptici, inter species affines pro rata majusculi, 28–32 mm longi, in sicco 13–14 mm crassi, basi (dum sicci) in partem subpedicellarem 5–6 mm longam abrupte angustati, superne attenuati et apice conico-mamillato terminati; semine olivaeformi 22 mm longo, 11 mm crasso, apice obtuso, basi in caudiculum elongatum subspinescentem producto; albumine dense radiato-ruminato. Perianthium fructiferum depresso-cupulare, truncatum, in ore minime constrictum, 7 mm latum, 3.5 mm altum, divisionibus in margine rotundatis et in medio minime apiculatis.

Babuyanes Islands, Camiguin, *Bur. Sci. 4044 Fénix*, June, 1907, on steep forested slopes.

A very characteristic species because of its relatively large bifarious fruits, which, when dry, appear as if they were distinctly pedicellate, the seeds being produced at the base into a conspicuous almost spiniform caudiculum.

CALAMUS Linn.

Calamus mitis Becc. sp. nov.

Scandens, gracilis, caudice vaginato 15 mm diam., vaginis virescentibus, glabriusculis, inermibus. Ocrea subnulla. Folia brevia, in parte pinnifera 35–40 cm longa, cirro gracili irregulariter crebreque aculeato terminata; petiolo subnullo; segmentis paucis (utrinque 5 vel 6) irregulariter remoteque alternis (minime aggregatis), elliptico-oblongis vel oblanceolato-ellipticis vel oblongo-subspathulatis, leviter concavo-convexis, chartaceis, utrinque irridibus et opacis, basi sensim attenuatis et acutis, superne in acumen breve ad margines vix setigerum abrupte coarctatis, 5-costulatis; costulis utrinque nudis; marginibus remote et inconspicue spinulosis; segmentis intermediis 20–24 cm longis, in medio vel paullo supra medium 5.5–6.5 cm latis, basilaribus aliquantum superioribus paullo minoribus. Spadix ♀ gracilis, erectus, rigidulus, 0.85–1 m longus, caudiculo gracili inermi terminatus; spathis primariis tubulosis non arcte vaginantibus, in ore truncatis, parce spinulosis vel inermibus; inflorescentiis partialibus paucis (2 vel 3) ad faucem spatharum insertis, brevibus (6–8 cm longis); spathis secundariis breviusculis, infundibuliformibus, laxe vaginantibus; spicis brevibus, utrinque 5 vel 6, distiche alternis, vix curvulis (non scorpioideis), regulariter bifarie floriferis, basilaribus 3 cm longis. Involucrophorum discoideum pedicello brevi crasso elevatum. Involucrum involucrophoro subconforme et vix superans. Perianthium fructiferum brevissime pedicelliforme. Fructus parvi, globosi, rostro subcylindrico gracili terminati; squamis per orthostichas 16–18 ordinatis, late rhombeis, subplanis, opacis, in medio vix sulcatis, apice obtusis. Semen globosum, superficie aequabili, fovea chalazae angusta, centrali, circulari, profunda; albumine aequabili; embryone basilari.

Babuyanes, Camiguin Island, *Bur. Sci. 4075 Fénix*, July, 1907: Batanes, Batan Island, *Bur. Sci. 3817 Fénix*, June, 1907. The fruit is said to be white and edible. N. v., *Tebdas.*

This species seems to be related to *Calamus cumingianus*, but the leaflets are not in groups and the pistillate spadix is simple, not ultra-decompound.

Calamus siphonospathus Mart., var. **batanensis** Becc. var. nov.

Caudicis vaginae spiculis pallidis gracilibus armatae; frondium petiolus supra planus et aculeis brevibus armatus, subtus inermis; segmenta aequidistantia, costulis 3–5, supra setosis, subtus saepius omnino levibus, armata; spathae modice inflatae, omnino inermes; inflorescentiae partiales parvae, spicis paucis, basilaribus tantum vix ramosis; fructus anguste elliptici, 10–11 mm longi, 5 mm crassi, squamarum orthostichae 14 vel 15.

Batanes, Batan Island, *Bur. Sci. 3611 Fénix*, May–June, 1907, with immature fruit.

This is apparently a local form of *Calamus siphonospathus* Mart., approaching also *C. dimorphacanthus*. It differs from the type of the former in its regularly set leaflets, its more elongated spadix which is not very ventricose, its smooth spathes, and in its small, slightly branched, partial-inflorescences. In fruit it resembles *C. dimorphacanthus*, but the leaf-rachis is armed with very small "uniform" prickles on the upper surface only.

Calamus mollis Blanco.
Babuyanes, Camiguin Island, *Bur. Sci. 4032 Fénix.*

DAEMONOROPS Blume.

Daemonorops Gaudichaudii Mart.
Babuyanes, Camiguin Island, *Bur. Sci. 4066 Fénix.*

NEW GENERA AND SPECIES OF BORNEAN FERNS.

By Edwin Bingham Copeland.
(From the Bureau of Education, Manila, P. I.)

Dr. F. W. Foxworthy of the Bureau of Science spent three months of the present year in Sarawak. In his collection are several very interesting ferns, while as a result of his visit, Mr. John Hewitt, curator of the Sarawak Museum, sent me a collection of ferns recently prepared by himself, Mr. C. J. Brooks, and Mr. H. S. Young. Beside the *Hymenophyllaceæ*, which I have not yet had time to study, there are a few other novelties in this collection which are not described here.

MACROGLOSSUM Copel. genus novum.

Marattiacea angiopteridea caudice globoso, frondibus pinnatis, pinnis simplicibus, maximis, venulis recurrentibus carentibus, soris ad marginem bullatam restrictis istam ejus laminam occupantibus, sporangiis quam in Angiopteride numerosioribus.

Macroglossum Alidae Copel. spec. nova. (Plate I.)

Frons 3 m alta; rhachi straminea; pinna pulvinato-subsessile, subcordata, ligulata, 40–55 cm. longa, 5–6.5 cm. lata, caudata, integra, glabra, subcoriacea, supra atro-viride, infra olivacea; venulis liberis, furcatis, proximis; soris 3–3.5 mm longis, sporangiis 18–22-jugis.

Sarawak, Bau, on limestone, *leg. H. S. Young.*

By Mr. Young's request, this species has been named after Mrs. C. J. Brooks.

Matonia Foxworthyi Copel. spec. nova. (Plate II.)

Segmentis fere horizontalibus, rectis, linearibus, apicibus rotundatis, truncatis, vel retusis; soris utroque latere segmenti cujusque saepe 2 nec non rarius 3.

Sarawak, Mount Poë (Rumput), alt. 1,700 m, *Foxworthy 372* (type), *373*.

Matonia pectinata R. Br., of Mount Ophir, Malacca, has the segments falcate and acute, leaving the costa of the pinnule at a much more acute angle, and narrowed from the base. The longer pinnules of *M. Foxworthyi* are above 40 cm long, the longest segments 35 mm. I know this Bornean plant only from Foxworthy's collection, and can not say whether the *M. pectinata* previously reported from Sarawak is really like the Mount Ophir plant, or is this species, but presume that the latter is the case.

PHANEROSORUS Copel. genus novum.

Genus Matoniacearum, ob rhachin frondis sympodialem, pinnas dichotomas et soros haud ad anastomoses venularum plurium impositos a Matonia separandum.

Phanerosorus sarmentosus (Bak.) Copel. comb. nova. (Plate III.) (*Matonia sarmentosa* Baker Journ. Linn. Soc. Bot. 24 (1887) 256.)

Dr. Foxworthy has collected for me at Niah, Sarawak, the type locality, very copious material of this fern. The ultimate divisions of the frond are sometimes entire, sometimes sinuate or broadly crenate; they are at most 14 cm long. The sori are sometimes borne, as hitherto supposed, on free veinlets; but more often on an anastomosing vein which incloses a costal areola. Such costal areolæ without sori are not uncommon. Well-developed specimens fruit very copiously. 13 is a common number of sporangia in a sorus. The indusium is not strongly inflexed as in *Matonia*. The sporangia are flattened, not as round as in *Matonia;* and the annulus, which is irregular, has many more cells. *Phanerosorus* and *Matonia* are decidedly more distinct than it is customary to expect genera to be in other families.

Dryopteris athyriocarpa Copel. spec. nova.

Rhizomate erecto, parvo, 3 mm crasso, stipitibus 20 cm altis, purpureonigris, paleis castaneis, lanceolatis, valde attenuatis, deorsum dense sursum sparsissime castaneo-paleaceis, aliter glabris; fronde ca. 20 cm alta, 7 cm lata, acuminata; rachi infra deorsum castanea alibi viride, supra et costa villosis infra fere glabra; pinnis plerisque sessilibus, horizontalibus, 35 mm longis, 12 mm latis, obtusis, ad alam angustam pinnatifidis, costa infra haud pilosa, pinnis infimis majoribus deflexis segmentis earum fere ad mediam pinnatifidis; segmentis utroque latere ca. 10, lineari-oblongis, obtusis, inferioribus inciso-serratis, superioribus integris, minute ciliatis, supra ad venulas pilosis infra ubique etiam ad indusia glanduligeris, membranaceis, venulis simplicibus; soris polymorphis, nunc dryopteroideis, multo saepius athyrioideis, rarius rectis, indusio vix coriaceo.

Sarawak, Bongo Mountain, *leg. Brooks & Hewitt 2.*

This species differs from its nearest relative, *D. viscosa* (J. Sm.) C. Chr. in the naked underside of the costa, thinner texture, more cut fronds, and chiefly athyrioid sori. In the original *Lastraea viscosa, Cuming 401,* from Malacca, there are a few athyrioid sori and the stipe is almost glabrous; Philippine plants referred to *D. viscosa* are much more hairy throughout.

Dryopteris Hewittii Copel. spec. nova.

Rhizomate breve repente, paleis lanceolatis brunneis vestito; stipitibus gracilibus, rectis, rhachidibusque sulcatis et in sulca pilosis, aliter glabris, frondium sterilium ca. 10 cm, fertilium ca. 20 cm altis; fronde sterile ca. 12 cm alta, 5 cm lata, acuta; pinnis proximis, rectis, obtusis, apices versus grosse inciso-serratis, rhachin versus fere integris, truncato-uniauriculatis, 25 mm longis 7–8 mm latis, infimis deflexis parallelibus, herbaceis, costa excepta glabris et costa infra fere glabris; venulis utroque latere 2, superioribus plerumque liberis; fronde fertile 15 cm alta, 4 cm lata, acuminata, pinnis acutius auriculatis, cuspidato-acutis, supra mediam serratis, vix 5 mm latis; soris prope baseos venularum impositis, confertis; indusiis setigeris, cucullatis, diaphanis, sinu clauso, vel interdum peltatis.

Sarawak, Bongo Mountain, Feb. 1908, *leg. Brooks & Hewitt.*

This is superficially quite like *D. canescens* var. *achrostichoides*, but much more glabrous, and with the indusia large and persistent.

Dryopteris Brooksii Copel. spec. nova.

D. gregis D. basilaris et D. luzonicae Christ, pinnis valde falcatis, indusio nullo vel evanescente distincta.

Rhizomate ut videtur repente, 6 mm crasso, pedeque stipitis paleis nigris vestitis; stipite viride, basi excepta glabro, sulcato, 40 cm alto; fronde 80 cm alta, 15 cm lata; pinnis utroque latere ca. 30, infimis minutis 6 cm remotis, sequentibus sat remotis, maximis 10 cm longis, 1 cm latis, acuminatis, auriculatis, sessilibus basibus truncatis, falcatis, leviter lobatis, herbaceis, glabris; lobis 1–2 mm longis, 3–4 mm latis, plerumque truncatis: venulis ca. 4-jugis, infimis anastomosantibus, aliis liberis, simplicibus; soris medialibus, orbicularibus, subimmersis, supra conspicuis, indusiis nullis vel caducis.

Sarawak, Bidi, April, 1908, *leg. C. J. Brooks.*

This somewhat suggests *D. arbuscula*, but is glabrous, and otherwise distinct enough.

MESOCHLAENA R. Br.

Mesochlaena larutensis (Bedd.) v. A. v. R.

Sarawak, Bidi, *C. J. Brooks 5.*

This specimen agrees with Beddome's description, except that the stipe is longer and the pinnæ broader.

I have hitherto been disposed to regard *M. polycarpa* as merely an aberrant *Dryopteris* unworthy of generic separation, but the study of this plant, so distinct in minor respects, although having in common the peculiar pubescence of paleæ, hairs and glands, with the indusium character accentuated, makes it clear that *Mesochlaena* is a small group with many characters, instead of a single peculiar species. It therefore seems desirable to continue to maintain the genus as a fixed and well-marked offshoot of *Dryopteris*. The two sides of the indusium are often unequal. By definition the genus can not easily be distinguished from *Athyrium* § *Callipteris*, to which it is really not nearly related.

LOMAGRAMMA J. Sm.

Lomagramma Brooksii Copel. spec. nova.

Rhizomate alte scandente, stipiteque 4 cm longo paleaceis; rhachi deorsum paleacea, sursum fere glabra et anguste alata; pinnis sterilibus ca. 8 cm longis, 15 mm latis, fere integris, coriaceis, nisi ad costas glabris, basibus truncatis, apicibus falcatis breviter acuminatis; venulis immersis, areolis costalibus parvis; lamina viride, venulis infra rubellis; pinnis fertilibus plus falcatis, ca. 3 mm latis, basibus dilatatis non auriculatis.

Sarawak, Bongo Mountain, *leg. Hewitt & Brooks.*

Near *L. pteroides* var. *subcoriacea* and *L. perakensis* Bedd. In the specimen sent me the pinnæ are sterile throughout the most of the frond, the apical ones

being fertile. The occurrence of sterile and fertile pinnæ on the same frond is hitherto unknown in the genus. It is possibly abnormal in this case, but I believe the species is sufficiently distinct without this character.

Athyrium vestitum (Pr.) Milde?

Sarawak, Bidi, on limestone, *leg. Brooks*.

This plant differs from Cuming's, collected in Samar, in that the pinnæ are abruptly contracted and then acute, instead of obtuse, that they are widest two-thirds of the way to the apex, instead of just above the base, that the lowest pinnules are notably reduced, that the sori are shorter (perhaps due to age or condition) and especially in the remarkable black border of the scales, which is several cells deep: in our *A. vestitum* no large scales are present, and there is at most a black border 1 cell wide.

The real *A. vestitum* of Samar will probably be collected again in the near future, and with more complete material of it, including the rhizome and stipe, it will be easy to decide positively whether or not the Sarawak plant should be regarded as distinct.

Cyclopeltis mirabilis Copel. spec. nova. (Plate IV.)

Stipite ultra 35 cm alto, 4–5 mm crasso, brunneo, sparse paleaceo paleis setiformibus usque ad 10 mm longis plerisque adpressis; fronde 60 cm alta, rhachi deorsum ut stipite, sursum brevissime pilosa: pinnis sessilibus, articulatis, 16 cm longis, valde extenuatis, 2 cm latis (hastis exceptis), integris vel irregulariter grosse dentatis, coriaceis, olivaceis, costis infra pilosis mox glabrescentibus, aliter glabris, hyperhastatis, hasta superiore 3 cm inferiore 5 cm longis caudato-acuminatis; venis pinnatis, liberis, soris in series 4 sat regulares instructis, parvis.

Sarawak, Mount Bidi, *leg. C. J. Brooks*.

The very large basal prongs give this fern a most bizarre aspect.

Lindsaya Hewittii Copel. spec. nova. (Plate V.)

Rhizomate repente, 15 mm crasso, paleis minutis castaneis vestito, lignoso; stipitibus seriatis, 25–30 cm altis, castaneis, nitidis, sursum supra rhachique pallido-bimarginatis; fronde stricta, ca. 15 cm alta, 8–15 cm lata, glabra, bipinnata; pinnis utroque latere 2 vel 3 et terminale majore, lineari-lanceolatis valde sensim acuminatis; pinnulis infimis et supremis cuneiformibus, medialibus 7 mm longis, 2.5 mm latis, dimidiatis, cuneatis, apice plerumque truncatis, margine acroscopica leviter incisa, basiscopica integra recta vel leviter recurva, tenuiter coriaceis; venulis sat conspicuis anastomosantibus; soro plerumque uno, apicale, inframarginale, rarius aliis minoribus ad lobos subapicales.

Sarawak, Mount Poë, *leg. J. Hewitt*.

The nearest relative of this species, as is shown especially by the position and appearance of the sorus, is *L. orbiculata* (Lam.) Mett.; superficially it more strongly suggests *L. davallioides* or *L. rigida;* or still more strongly the American *L. stricta*.

Tapeinidium pinnatum (Cav.) C. Chr.

Specimens collected by *Foxworthy, Nos. 189, 209,* differ uniformly from those of the Philippines in being deltoid in outline.

Histiopteris stipulacea (Hooker) Copel. (*Pteris stipulacea* Hooker, Sp. Fil. 2: 233.)

Sarawak, summit of Mount Matang, *leg. J. Hewitt.*

This species is not even mentioned in the Synopsis Filicum of Hooker and Baker, but is referred by Christensen to *H. incisa*. *H. incisa* is turgid enough, without our trying to make it hold this fern. Mr. Hewitt's specimen fits Hooker's description in every detail except that the pinnules are sessile and sometimes extravagantly hastate.

Loxogramme iridifolia (Christ) Copel.

A specimen collected by Mr. Hewitt on limestone hills of Upper Sarawak is exactly this species except that the sterile fronds have rounded apices, and a note says that in older plants these are longer and acute or acuminate. The species is already known from Celebes and Mindanao.

I anticipate that when the Bornean fern flora is at all completely known, it will cease to appear, as it does at present, that the fern flora of the Philippines is more nearly related to that of Celebes than to that of Borneo. This *Loxogramme* is one piece of temporarily valid evidence. Another is the distribution of the genus *Acrosorus;* but *Polypodium triangulare* Scort. ex Bedd. in Journ. of Bot. 25 (1887) 324, *plate 278, fig. I.* is without doubt an *Acrosorus*, to be known as **A. triangularis.** It was collected in Perak, but the genus may now be looked for confidently in Borneo.

Polypodium (Goniophlebium) coloratum Copel. spec. nova. (Plate VI.)

Rhizomate scandente, vix 2 mm crasso, caesio-glauco, paleis setiformibus squarrosis rubido-badiis vel badiis sparse et brevissime ciliatis basibus dilatatis peltatis dense vestito; stipitibus remotis, articulatis, latericiis, nitidis, glabris, rectis, 10 cm altis; fronde 10 cm alta, 4 cm lata, acuminata, ad alam angustissimam pinnatifida, glabra, subcoriacea, rhachi supra sulcata; segmentis infimis vix diminutis, maximis 22 mm longis, 3 mm latis, rectis, obtusis, levissime serratis; venulis anastomosantibus seriem unam areolarum includentibus, aliter liberis apicibus signatis, venulis liberis inclusis nullis; soris parvis, uniseriatis ad venulas anastomosantes sed haud in alas venularum.

Sarawak, Mount Poë, *leg. J. Hewitt.*

Polypodium (Goniophlebium) proavitum Copel. spec. nova.

Rhizomate repente, 3 mm crasso, caesio-glauco, paleis setiformibus squarrosis nigris basibus dilatatis peltatis vestito; stipitibus articulatis, atro-castaneis, glabris, 10–15 cm altis; fronde ca. 50 cm alta, 8–11 cm lata, valde acuminata, ad alam angustissimam pinnatifida, glabra, rhachi nigra supra sulcata; segmentis infimis ad alas reductis, maximis 6 cm longis, rectis vel falcatis, acutis, ca. 4 cm latis, 1 cm distantibus, marginibus plantae siccae revolutis, basibus dilatatis connexis, integris, coriaceis: venulis seriem unam areolarum venulis liberis carentium, rarius alteram interruptam efficientibus; soro extra areolam quamque costalem uno, parvo; sporangiis globosis.

Sarawak, Bongo Mountain, *leg. Brooks & Hewitt.*

Neither this nor the preceding species fits in any one of the usually recognized subgenera of *Polypodium*. Both have the characteristic rhizome and scales of true *Goniophlebium*. They have also a general aspect familiar in *Goniophlebium*, but still more so in *Eupolypodium*. In *Goniophlebium* simply pinnatifid fronds with the segments dilated at the base are much commoner in the American plants referred to this sub-genus, but occur also in a number of Old World species, especially in northern India. On geographical grounds, and because of the resemblance to *Eupolypodium*, and because of less structural specialization, this would naturally be regarded as the primitive form of *Goniophlebium*, from which "*Shellolepis*" is a derived group.

The primitive and generalized character of these plants is much more evident in the venation. In both species there is a costal row of areolæ, but *these areolæ contain no free veins*. The sori are borne sometimes on the vein which incloses the areola, sometimes against this vein but on a rudimentary branch excurrent from it. *P. proavitum* occasionally has other veins excurrent from this one. The venation then is neither that of typical *Goniophlebium* nor of *Phymatodes*, but is a generalized one, suggesting both of these. The structural similarity of *Goniophlebium* (*Shellolepis*) and *Phymatodes* and *Selliguea* I have already noted.[1] Mr. Maxon has since told me that in his opinion these constitute a single group properly to be regarded as a genus. The discovery of these Bornean ferns is the best possible support for his judgment as to the affinity of *Phymatodes* (and *Selliguea*) to *Goniophlebium*, and shows that *Goniophlebium*, including them would certainly be a natural genus: but, so is *Polypodium* natural; and, unwieldy though it is, there is no hurry about dismembering it.

Polypodium sabianianum Christ Philip. Journ. Sci. 2 (1907) Bot. 177.
Sarawak, Mount Bidi, *leg. Brooks*.

Frondibus pubescentibus, grandibus, herbaceis, seriebus areolarum praestantium duabus, a P. myriocarpo (Pr.) Mett. diversum.

The fronds of the Bornean specimens are more than 60 cm long and about 6 cm broad.

Described from Philippine specimens.

Polypodium ceratophyllum Copel. spec. nova. (Plate VII.)

Polypodium epiphyticum, rhizomate repente, 1 mm crasso, paleis ferrugineis 2.5 mm longis setiformibus basibus peltatis vestito; stipite gracile, brunneo-fulvo, articulato, ca. 8 cm alto sed supra medium lamina decurrente alato; fronde, ala decurrente exclusa, ca. 2.5 cm alta, ca. 4 cm lata, iterum bifurcata, ramis late divergentibus, superioribus ca. 2 mm latis, obtusis, coriaceis, glabris, margine angusta cartilaginea sub lente levissime incisa; venis occultis, laxe anastomosantibus; soris superficialibus, utroque latere costae nigrae uniseriatis.

Sarawak, Mount Poë, alt. 1,300 m, *Foxworthy 205*.

A species of the *Microterus* group, but with dichotomous fronds. On a separate rhizome are sterile fronds, broad and short and only once or twice forked; they may be fronds of an immature plant, or the sterile fronds of an adult.

Syngramma angusta Copel. spec. nova.

Rhizomate repente, lignoso, 2.5 mm crasso, paleis lanceolatis minutis obscuris coronato: stipitibus confertis, nisi ad baseos sparse paleaceas glabris, frondium sterilum 5–8 cm fertilium ca. 20 cm altis; fronde

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[1] *This Journal*, 2 (1907) *Bot.* 74.

sterile 22–30 cm alta, 2 cm lata, valde acuminata, haud decurrente, integra, subcoriacea, glabra, inter venulas furcatas aliis simplicibus e costa ortis, margine cartilaginea, venula intramarginale longitudinale nulla; fronde fertile ca. 20 cm alta, vix 5 mm lata, venulis usque ad marginem tenuem cartilagineum liberis, ubique fertilibus.

Sarawak, Bidi, on river bank, *leg. C. J. Brooks.*

Distinguishable from its several Malayan relatives by the venation, but with other differences from any single species hitherto known.

Syngramma Hookeri C. Chr. (*Hemionitis lanceolata* Hook).

Sarawak, in a ravine near the summit of Mount Poë, alt. 1,300 m, *Foxworthy 227.*

Already known from New Guinea and Fiji.

Taenitis drymoglossoides Copel. spec. nova. (Plate VIII.)

Rhizomate omnino Taenitidis typicale: stipitibus seriatis proximis, 8–12 mm altis, inarticulatis, deorsum rubidis, sursum rufo-stramineis, glabris: fronde dura, coriacea, glaberrima, supra atroviride nitida, infra olivacea, simplice, integra, elliptico-oblonga vel lineari-oblonga, costa mediam in frondem latam, supra mediam frondem angustam dissipata; soro inter costam marginemque super apicem costam transeunte continuo, leviter immerso.

Sarawak, Bongo Mountain, February, 1905, *leg. Brooks & Hewitt 20.*

By the usual definition this would be a *Drymoglossum*, but that genus properly construed is a near relative of *Cyclophorus*, but by no means near to *Taenitis*. *D. rigidum*, which I know only by description and figures is apparently near this species and also to be transferred to *Taenitis:* its fronds are more dimorphous and the sori deeply immersed. If these ferns are derived from any *Polypodieæ* it is from *Loxogramme*, not from *Drymoglossum*.

ILLUSTRATIONS.

(Photographs by Charles Martin.)

PLATE I. ***Macroglossum Alidae*** Copel.
II. ***Matonia Foxworthyi*** Copel.
III. ***Phanerosorus sarmentosus*** (Baker) Copel.
IV. ***Cyclopeltis mirabilis*** Copel.
V. ***Lindsaya Hewittii*** Copel.
VI. ***Polypodium coloratum*** Copel.
VII. ***Polypodium ceratophyllum*** Copel.
VIII. ***Taenitis drymoglossoides*** Copel.

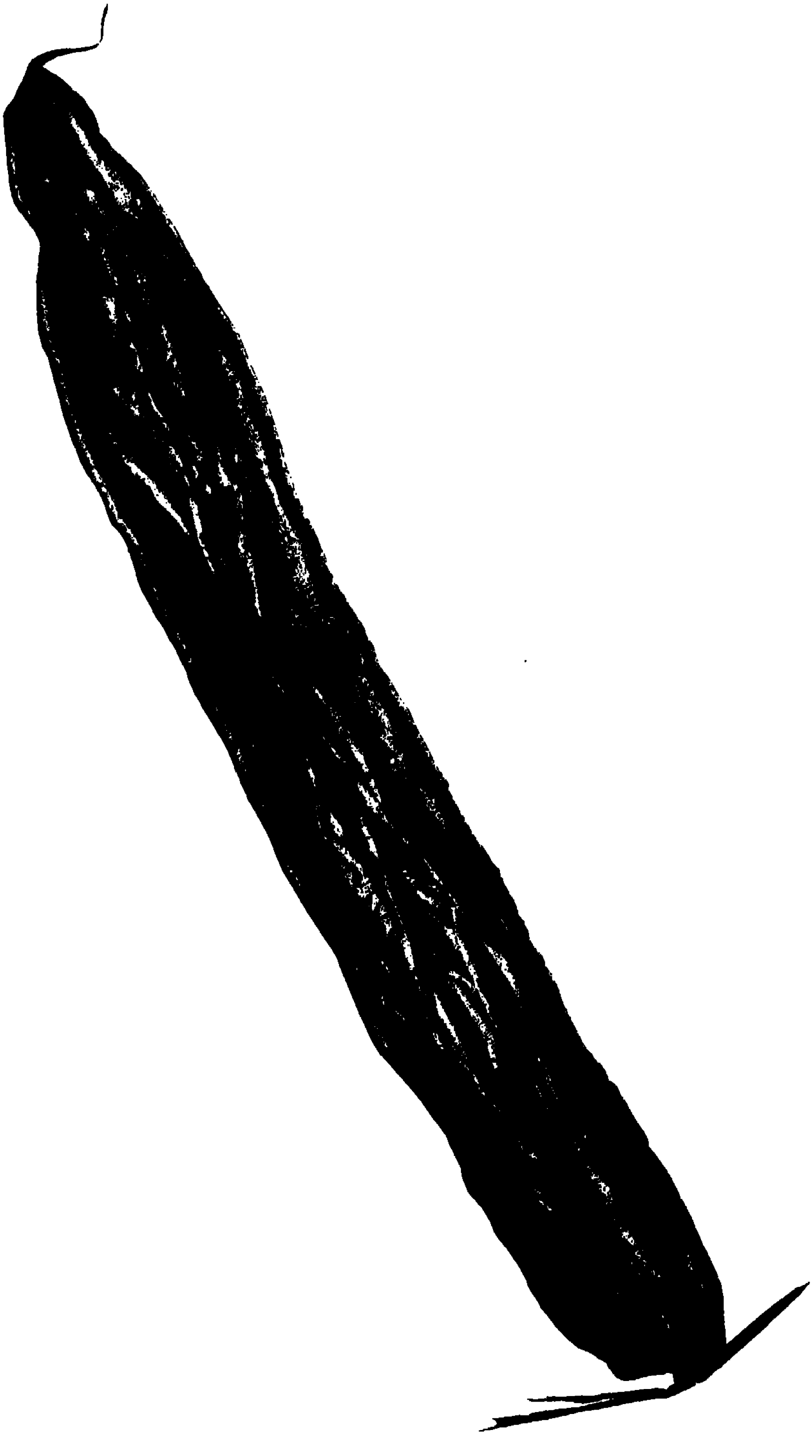


PLATE I.

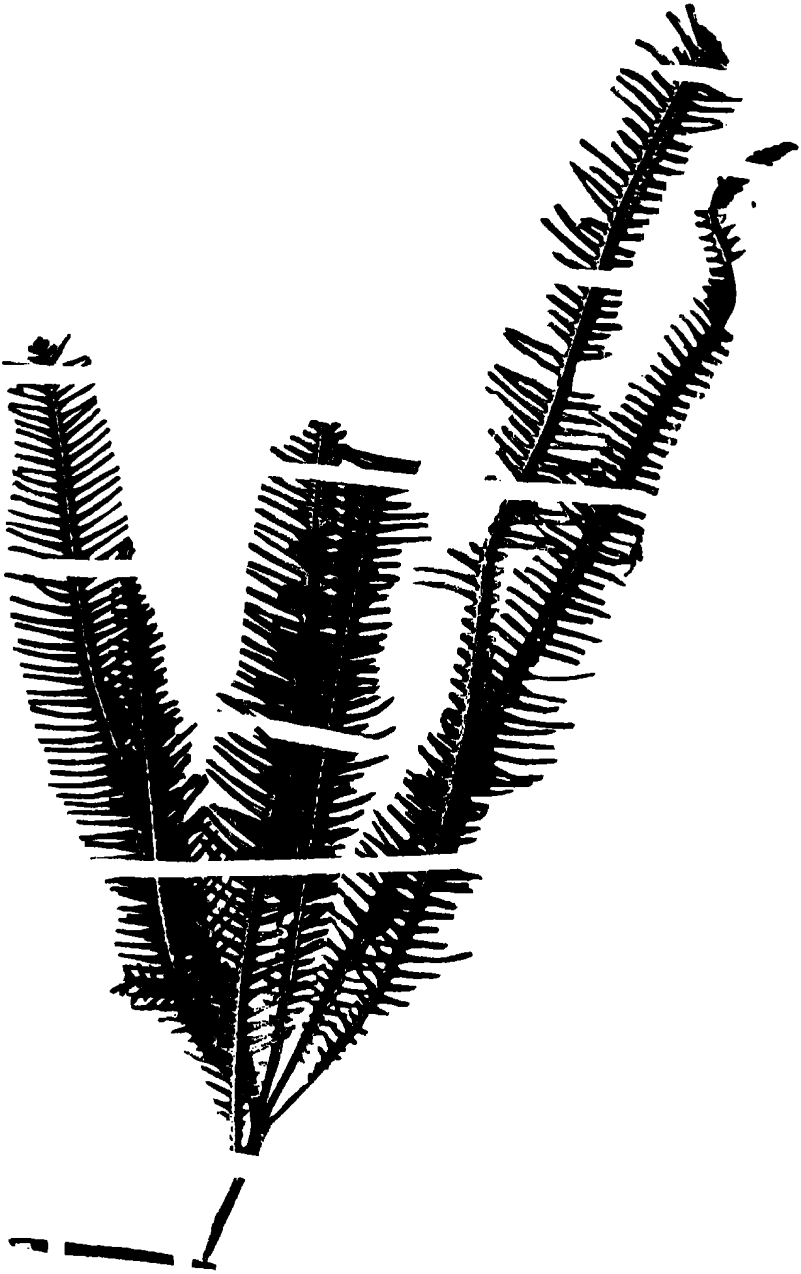


PLATE II.

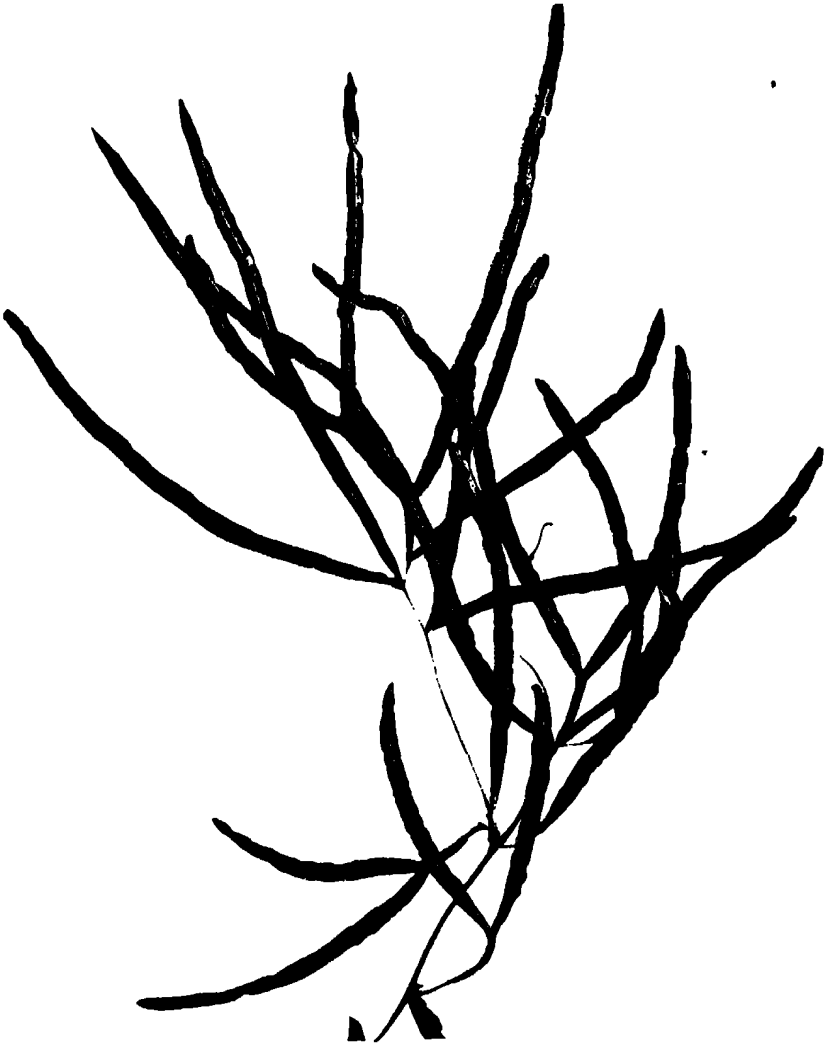


PLATE III.

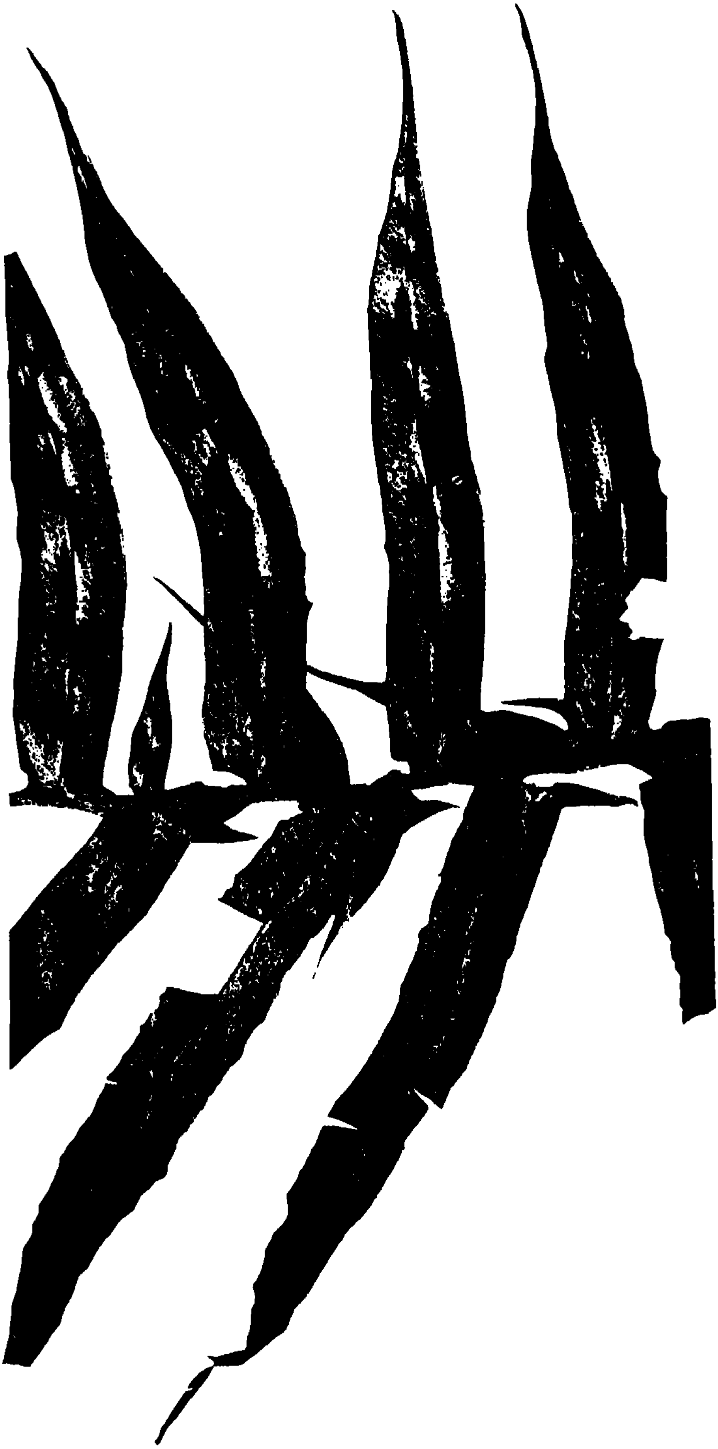


PLATE IV.

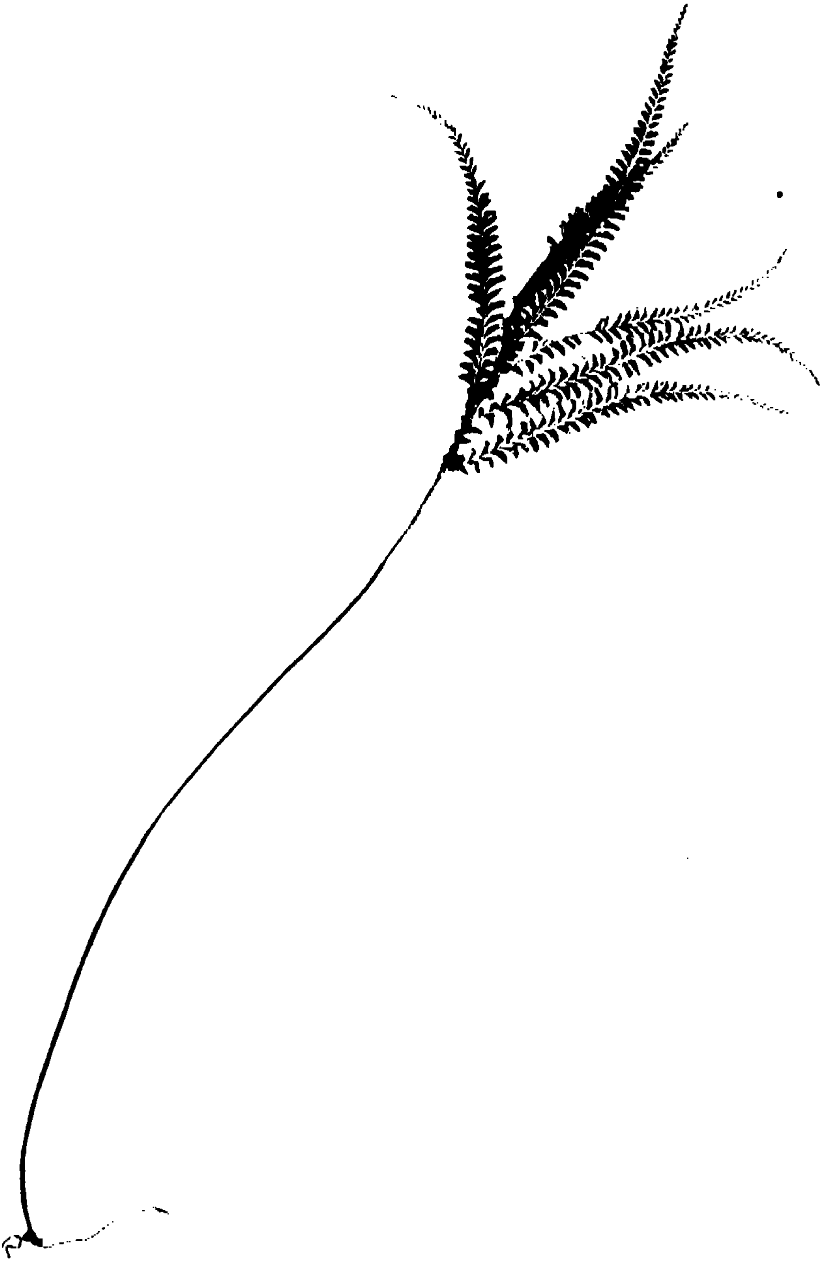


PLATE V.

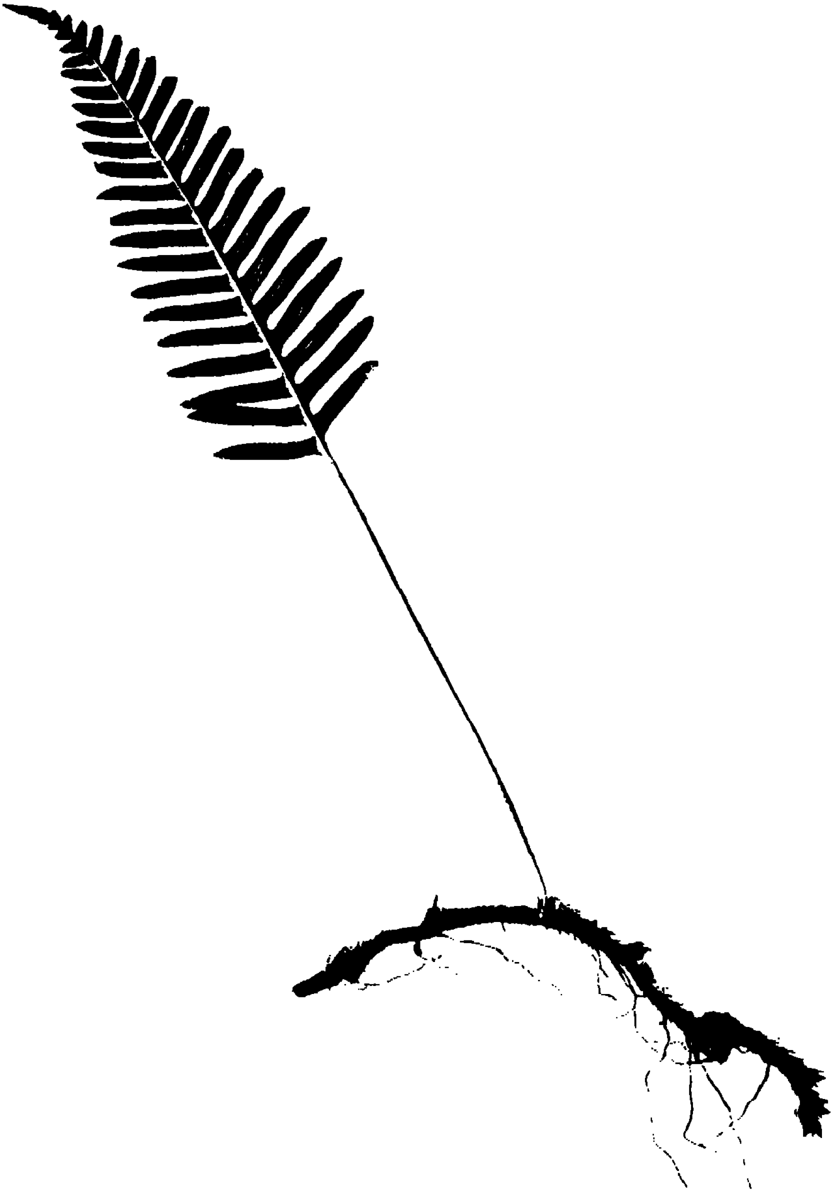


PLATE VI.

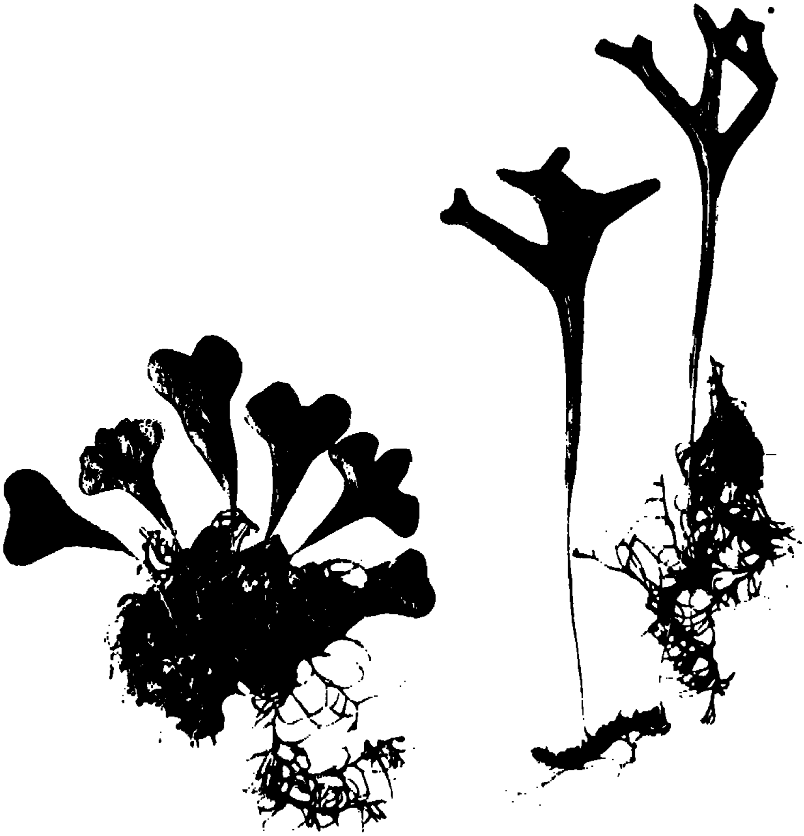


PLATE VII.

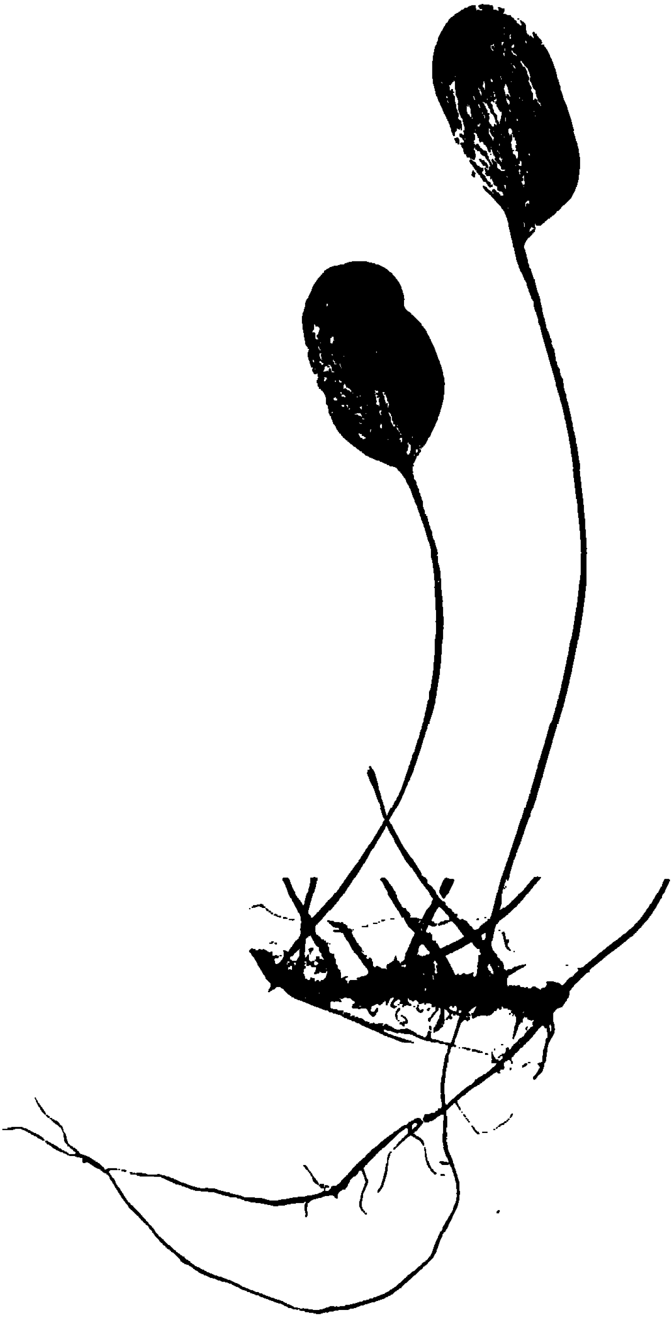


PLATE VIII.

NEW SPECIES OF CYATHEA

By EDWIN BINGHAM COPELAND

(From the Bureau of Education, Manila, P. I.)

In the recent preparation of a comprehensive treatment of the *Cyatheæ* of Asia and Malaya I have found a number of species apparently hitherto unknown and as it is desired for the sake of convenient general and field use as a 'flora' to present the general treatment entirely in English these new species are here published separately.

The customary division of these tree ferns into three genera (*Cyathea*, *Hemitelia* or *Amphicosmia*, and *Alsophila*) has for many years had no defenders even among those who have maintained them in deference to custom and supposed convenience. As a matter of fact, I do not find this division even convenient. There are so many species with evanescent partial or so called spurious indusia that the generic assignment of a specimen often depends upon its age or preservation and even when working with perfect and fresh material too much depends upon individual judgment.

The vital objection however to maintaining these genera is not inconvenience but the fact that as every pteridologist knows they are not natural. This is so well understood that the enumeration of instances of close affinity between indusiate and exindusiate species would be superfluous. The indusium is as valueless as a generic character here as it is in *Dryopteris*; in both groups there are single species the status of which in this respect is ambiguous.

The only reason for the maintenance up to this time of these genera has been the feeling that it was inexpedient to give them up until a better generic classification of these ferns could be offered in place of the one in use. It certainly will be possible and for the most part is possible now, to arrange these ferns in groups more natural than the three genera recently upheld, but I have come decidedly to the opinion that because of the naturalness and evident homogeneity of the whole group, and because of the difficulty of defining the more natural minor groups, it is not and will not be desirable to make any generic division whatever of these tree-ferns. I have therefore treated them all as species of one genus, *Cyathea*, and have merely indicated, for the convenience of those to whom this construction may at first seem strange, those species which would belong to the artificial genus *Alsophila*

Cyathea (Alsophila) atropurpurea Copel. spec. nova.

Caudice 2 m alto, 4 cm crasso; fronde 150 cm alta, 60 cm lata; pinnis infimis remotis, diminutis; stipite breve usque ad basin pinnis paucis perreductis, lamina fere carentibus, praedito; rhachi atropurpurea, inerme, supra in sulca pubescente, aliter glabrescente; pinnis medialibus maximis 30 cm longis, 13 cm latis, acutis, breviter stipitatis, rhachi supra sparse pilosa, infra squamulis sparsioribus praedita; pinnulis 7 cm longis, 15 cm latis, caudatis, brevi-stipitatis, profunde pinnatifidis, et ad basin majorum pinnatis nec non pinnis ^{II} brevissime pedicellatis, costis supra pubescentibus infra costulisque squamulis bullatis vestitis; segmentis oblongis, obtusis, sat grosse serratis; lamina sicca papyracea, purpureo-viride, glabra; venulis simplicibus, utroque latere ca. 5; soris fere costalibus, receptaculo grande, indusio nullo.

Mount Halcon, Mindoro, alt. 750–1,050 m, *Merrill 6056*. This plant differs from *A. ramispina* in being tripinnate at the base of the pinnules, with secondary pinnules contracted at the base, and the segments everywhere conspicuously toothed. The reduced pinnæ at the base of the stipe, so evidently pinnæ that Hooker could hardly have failed to mention their nature, are not stout enough well to be called spines. *A. glabra* is without the bullate scales and has the lower sori remote from the costa. *A. dubia* is a form with the pinnules very shallowly cut.

Cyathea mitrata Copel. spec. nova.

Arbor caudice stipiteque ignotis; rhachide 6 mm crassa, brunnea, minute nodulosa, sparsissime furfuraceo-squamulosa, glabrescente, apud baseos pinnarum et alibi aerophoris cicatricoideis oblongis praedita; pinna fere 40 cm longa, 15 cm lata, sessile, rachi supra pilis et paleis paucis obscuris vestita, infra paleis sparsissimis lanceolatis 2 mm longis et aliis minutis sparsis furfuraceis praedita, ad basin incrassata et supra applanata; pinnulis ^{I} 7 cm longis, 15 mm latis, sensim acuminatis, sessilibus, pinnatis, costis supra pilosis infra paleis parvis irregularibus subbullatis et rarius aliis 3 mm longis lanceolatis vestitis; pinnulis ^{II} lineari-oblongis, obtusis, inferioribus multis pedicellatis, crenatis, vel inferioribus profunde lobatis, margine deflexa, lamina coriacea glabra supra nigra infra brunneo-viride; venulis fere occultis apud costulas furcatis; soris costalibus, 1.5 mm latis, laminam totam obtegentibus, indusio firmo globoso mox in partes duas fisso, persistente et perconspicuo.

Mount Malindang, Mindanao, alt. 2,800 m, *For. Bur. 4631 Mearns & Hutchinson.*

A species so remarkable for its black quadripinnatifid fronds and very large mitriform indusium, persisting long after the loss of the sporangia, that I think it may safely be described from a single pinna.

Cyathea (Alsophila) Fenicis Copel. spec. nova.

Filix arborea gregis C. (Alsophilae) contaminantis (Wall.), paleis paucis brunneis ad basin stipitis, segmentis latis, et soris strictissime costularibus distincta.

Caudice (teste Fénix) 9 cm crasso, breve; stipite ultra 60 cm alto atro-fusco, aculeis acutis 1 mm longis sparsis horrido, supra basin pinnis 2 pinnatis 6 cm altis praedito, ad basin paleis paucis angustis brunneis 15 mm longis adpressis vestito, aliter rhachibusque subasperulis glabris; pinnis maximis 35–40 cm longis, 20 cm latis, ovatis in apicem pinnatifidum abrupte contractis; pinnulis ca. 10 cm longis, fere 2 cm latis, sessilibus, acuminatis, apud rhachin ad costam sursum ad alam incisis, costis infra plerumque glabris, supra pubescentibus; segmentis 4 mm latis, obtusis, obscure serrulatis, costulis infra paleis parvis paucis praeditis, lamina glabra fere membranacea, supra atroviride, infra olivacea; venulis furcatis; soris ca. 0.7 mm latis, globosis, fulvo-stramineis, strictissime costularibus; indusio nullo.

Santo Domingo de Basco, Ins. Batanes, *Bur. Sci. 3797 Fénix.*

Cyathea Foxworthyi Copel. spec. nova.

Arbor caudice 2 m alto; stipite brevissimo, 1 cm crasso, infra squamulis minutis furfuraceis vestito et spinis validis brevibus acutis densis horrido, supra paleis setaceis atrocastaneis ca. 1 cm longis obtecto; fronde 150 cm alta, rhachi fere ad basin stipitis pinnis reductis praedita, sursum glabrescente, sparse asperula, fulvo-fusca; pinnis majoribus 45 cm longis, sessilibus, ad apicem pinnatifidum abrupte contractis, rhachibus supra purpureo-velutinis, infra minute tuberculatis, paleis minutis sparsis deciduis praeditis; pinnulis ca. 10 cm longis, 16 mm latis, sessilibus, sursum sensim in caudam serratam angustatis, vix ad costas pinnatifidis; costis supra pilosis, infra squamulis sparsis praeditis, atropurpureis; segmentis lineari-oblongis 3 mm latis, obtusis, acute serrulatis; lamina subcoriacea, glabra, viride, infra pallida; venulis utroque latere ca. 11, furcatis; soris costalibus, globosis, 0.8 mm latis; indusio fulvo, mox ore irregulare aperto dein sensim fatiscente.

Luzon, Mount Banajao, alt. 1,200 m, *Bur. Sci. 2462 Foxworthy.*

In spite of the fairly persistent and at first conspicuous indusium I believe this species is not very remotely related to *C. callosa* Christ and to *C. extensa* Swtz., the latter being the type species of *Alsophila*.

Cyathea chinensis Copel. spec. nova.

C. Confucii Christ Ac. Geog. Bot. 15 (1906) 102 *partim.*

Trunco usque ad 6 m alto; fronde grande; rhachi subglabra, haud apiculata; pinna maxima in herbario hongkongense 42 cm longa, 13 cm lata, sessile, acuminata, rhachi straminea, infra sparse pilosa supra densius pilis purpureo-fuscis adpressis obsita; pinnulis sessilibus, 7 cm longis, 14 mm latis, serrato-caudatis, profunde pinnatifidis, sinubus acutis; costis supra fusco-pilosis, infra pilis hyalinis et paleis minutis irregularibus sparsissimis vestitis; venulis utroque latere 7–9 plerisque furcatis, inconspicuis; segmentis 3 mm latis, subfalcatis, obtusis, serrulatis, herbaceis, viridibus infra paullo pallidioribus, costulis pilis et squamulis sparsis praeditis; soris costalibus, parvis, squamis laete brunneis subtensis, indusio alio nullo.

China, prov. Yunnan, Szemao forest, alt. 1,800 m, *Henry 13136*.

Christ (l.c.) does not regard this as specifically distinct from his *A. Confucii*; but beside the presence of the copious enough hyaline hairs it differs in the absence of prickles on the rachis; and, in less important particulars, in the pinnules, which are decidedly more truncate at the base and less pale beneath, and the obtuse segments with inconspicuous veinlets; and the collectors' notes indicate that this is a much larger plant.

Cyathea Mearnsii Copel. spec. nova.

Caudice 5 cm crasso, sursum radicibus paucis vestito; basibus stipitum paleis griseo-fuscis membranaceis 15 mm longis 1 mm latis praeditis; rhachi 1 cm crassa, fulva, ubique etenim superne glabra, inerme, infra insertionem pinnarum aciophoris parvis praedita; pinnis usque ad 60 cm longis, 25 cm latis, sessilibus, rhachibus glabris vel mox glabrescentibus, costisque supra atrobrunneo-pubescentibus; pinnulis sessilibus, valde acuminatis, horizontalibus, maximis 125 mm longis, apud rhachin usque ad 29 mm latis, versus rhachin ad costam, alibi ad alam angustam pinnatis, costa infra rubida, squamulis minutis furfuraceis praedita; segmentis falcato-acutis, serratis, 3–4 mm latis, costula infra interdum squamulosa excepta glabris, infra pallidis nec supra obscuris, coriaceis; pinnula ^{ii} infima saepe dilatata et ⅔ ad costulam laciniata, sessile, non adnata; venulis utroque latere ca. 13, fere omnibus furcatis; soris costularibus, multis, sed apicem segmenti haud attingentibus, 0.75–1.00 mm latis, indusio mox in segmenta magna fisso, (parte inferiore plus minus regulare excepta) transeunte, receptaculo globoso brevi-pilifero.

Luzon, Province of Benguet, *Bur. Sci. 2703, 2741 Mearns*. Distinguished from *C. spinulosa* by not having a spiny rachis nor bullate scales beneath the pinnules.

Cyathea (Alsophila) Curranii Copel. spec. nova.

Trunco 3 m alto, 20 cm crasso, cicatricibus 5 cm longis, 3 cm latis ornato; stipite ca. 35 cm alto, fusco, tuberculato, paleis membranaceis fulvis usque ad 63 mm longis valde attenuatis integris vel ad apicem minute setiferis ad basin 4 mm latis cordatis vel rotundato-peltatis nisi ad pedem stipitis mox caducis vestito; fronde ca. 1 m longa; rhachi brunnea, supra dense et brevissime pilosa, infra paleis parvis lanceolatis deciduis praedita, sat dense tuberculata, tuberculis parvis rarius acutis; pinnis medialibus 50° distantibus brevi-stipitatis, 35 cm longis, 17 cm latis, rhachibus infra atrocastaneis minute tuberculatis, paleis caducis praeditis, pinnis infimis diminutis deflexis et longius stipitatis; pinnulis sessilibus, 9 cm longis, 1 cm latis, sensim valde attenuatis, pinnatis, costa nigricante ubique glabra; pinnulis ^{ii} infimis supra rhachin pinnae deflexis nec adnatis, aliis adnatis sed plerisque liberis, confertis, subfalcatis, obtusis, integris vel obscure crenulatis, bullatis, coriaceis, supra brunneo-viridibus glabris, infra pseudo-glaucis, costulis rarissime paleatis paleis ovatis bullatis, venulis minutissime albido-pilosis; venulis utroque latere 8–11, simplicibus vel prope costulam furcatis; soris subcostalibus, dein confluentibus et paginam totam obtegentibus, indusio omnino carentibus, receptaculo minuto.

Luzon, Mount Banajao, alt. 2,000 m, *For. Bur. 7925 Curran & Merritt*.

An obvious relative of *A. latebrosa*, *A. calocoma* and *A. pustulosa*, clearly distinguished by the thin tawny scales at the base of the stipe, naked costæ and finely hairy veinlets. These hairs are often too minute for individual recognition with the hand lens. The glaucous appearance of the nether surface is chiefly due to the very numerous stomata.

THE PHILIPPINE SPECIES OF GARCINIA.

By Elmer D. Merrill.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

This difficult genus is rather largely represented in the Philippines, and its local study has been considerably complicated by difficulties encountered in the proper identification of the several species described by Blanco, as well as a number of manifestly erroneous identifications of Philippine plants made by later authors. The species are often obscure, and frequently difficult to classify even when complete material is available, while the difficulties encountered become proportionally greater when attempts are made to classify incomplete specimens. Frequently two species will closely simulate each other in all superficial and gross characters, but examination of the flowers will show them to belong to quite different sections of the genus.

Seventeen species are recognized in the following paper, which can hardly be considered as more than preliminary, but I am not at all sure that all those admitted will stand the test of time, especially those in the group with *Garcinia venulosa* (Blanco) Choisy. A full series of specimens, showing both staminate and pistillate flowers and mature fruits of each species, is greatly needed in this group.

Of the species previously credited to the Philippines, nothing has been done with the list given by F.-Villar in the Novissima Appendix to the third edition of Blanco's Flora de Filipinas, as no descriptions are given and no specimens are extant, so that any reductions of these species would be mostly a matter of surmise only. Vidal enumerates a number of species in his Revision de Plantas Vasculares Filipinas, some of which are manifestly admitted on erroneous identifications. I have examined most of the specimens cited by him, in the Kew Herbarium, and some of the species are disposed of below. Others I could not match with any recently collected material and these will have to be considered at a later date. *Garcinia morella*, to which three specimens are referred, is probably an erroneous identification, while *G. andersonii* certainly is, and one or both are probably undescribed; the specimen referred to the latter is remarkable in having leaves 1½ to 2 feet in length, and has only been found on the island of Alabat off the east coast of southern Luzon.

Twelve of the seventeen species below enumerated from the Philippines, are endemic in the Archipelago, while one, *Garcinia mangostana* Linn., is undoubtedly an importation from western Malaya. Five species are described as new and four are credited to the Philippines for the first time.

KEY TO THE SPECIES.

Flowers 5-merous (XANTHOCHYMUS).
Inflorescence terminal, cymose .... 1. *G. vidalii*
Inflorescence axillary, fasciculate.
Leaves broad and rounded at the apex; flowers subsessile .. 2. *G. subelliptica*
Leaves more or less acuminate at the apex.
Rudimentary ovary in the male flowers none; staminal phalanges free; flowers long-pedicelled .... 3. *G. dulcis*
Rudimentary ovary present in the male flowers, the staminal phalanges connate with it; flowers sessile or very shortly pedicellate.
4. *G. moselleyana*
Flowers 4-merous (EUGARCINIA).
Stamens of the male flowers many, occupying both sides of four pedicelled phalanges; anthers sessile, 2 celled, dehiscing longitudinally.
Flowers in short axillary cymes .... 5. *G. luzoniensis*
Flowers in axillary fascicles.
Leaves short-rostrate; nerves very numerous, slender, spreading, distinct.
6. *G. eugeniaefolia*
Leaves acuminate, not rostrate; nerves obscure, distant, ascending.
7. *G. dives*
Stamens of the male flower in a 4-lobed mass surrounding the rudimentary ovary.
Rudimentary ovary sessile; flowers large; fruit dark-purple, edible. The mangosteen .... 8. *G. mangostana*
Rudimentary ovary more or less peduncled; flowers medium; fruit green or yellowish .... 9. *G. benthami*
Stamens of the male flower many, in a single unlobed mass; anthers 2-celled, dehiscing longitudinally.
Rudimentary ovary wanting in the male flower .... 10. *G. cumingiana*
Rudimentary ovary present.
Some flowers with petaloid staminodes .... 11. *G. calleryi*
Flowers without staminodes .... 12. *G. venulosa*
Stamens 4 to 14; anthers dehiscing longitudinally; rudimentary ovary none.
Lateral nerves about 40 on each side of the midrib, dense; stamens 4.
13. *G. tetrandra*
Lateral nerves 10 to 20 on each side of the midrib, rarely more, distant.
Lateral nerves about 12; stamens 4 .... 14. *G. rubra*
Lateral nerves about 20; stamens 8 to 14 .... 15. *G. binucao*
Stamens many, united into a globose mass; dehiscence of the anther-cells circumscissile; rudimentary ovary none.
Anther-cells peltate .... 16. *G. mindanaensis*
Anther-cells not peltate .... 17. *G. lateriflora*

1. Garcinia vidalii sp. nov. § *Xanthochymus*.

Garcinia ovalifolia Vidal Sinopsis Atlas (1883) *t. 11, f. A*, non Hook. f. & Th.
Garcinia sp. Vidal Rev. Pl. Vasc. Filip. (1886) 53.

Arbor circiter 12 m alta; foliis coriaceis, obovatis vel elliptico-obovatis, apice late rotundatis vel leviter retusis, basi acutis vel leviter acuminatis, usque ad 25 cm longis, nervis utrinque circiter 40; inflorescentiis terminalibus, paucifloris; floribus 5-meris, sessilibus; fructibus globosis, carnosis, circiter 12-locellatis, 5 ad 6 cm diametro.

A tree about 12 m high. Branches and branchlets stout, somewhat angular, brownish or yellowish, rugose when dry. Leaves opposite, obovate or elliptical-obovate, 15 to 25 cm long, 6 to 14 cm wide, coriaceous, slightly shining above, somewhat paler beneath, the apex broadly rounded, often slightly retuse, rarely acute or even slightly acuminate, somewhat narrowed below to the acute or slightly acuminate base, the margins slightly recurved; lateral nerves about 40 on each side of the midrib, rather distinct, parallel, anastomosing near the margin, the reticulations obscure; petioles stout, 2 to 2.5 cm long, the upper surface inflated and stem-clasping. Inflorescence terminal, few-flowered, the ultimate branches each with three flowers. Flowers 5-merous, the staminate ones with stout, 4-angled, about 5 mm long pedicels, each subtended by two coriaceous ovate or orbicular bracteoles, the buds globose. Sepals 4. Petals 5, in bud orbicular. Stamens numerous, united into five masses, the rudimentary ovary with a disciform stigma. Fruit fleshy, greenish, smooth when fresh, subglobose, 5 to 6 cm in diameter, edible, about 12-celled, the sepals persistent, orbicular or reniform, accrescent, the inner pair about 15 mm wide, and 12 mm long, the outer pair similar but much smaller.

LUZON, Province of Rizal, Bosoboso, *For. Bur. 3093 Ahern's collector*, May, 1905, with immature flowers; *Bur. Sci. 2139 Ramos*, February, 1907, sterile: Province of Pangasinan, Eguia, *For. Bur. 8289 Curran & Merritt*, December, 1907, with mature fruit.

A characteristic species, readily recognizable by its rather large, numerously veined leaves which are broadly rounded at the apex and frequently retuse. It is certainly the species figured by Vidal as *G. ovalifolia*, which he later recognized as distinct from Hooker's species. A tree with a trunk diameter of about 40 cm, the bark with thick yellow latex. T., *Peris;* Pang., *Bunug.*

2. **Garcinia subelliptica** sp. nov. § *Xanthochymus.*

Arbor 10 ad 15 m alta, ramulis crassis, angulatis, flavo-viridibus vel flavo-brunneis; foliis ellipticis vel suborbicularibus, crasse coriaceis, nitidis, 8 ad 12 cm longis, 5 ad 10 cm latis, basi apiceque late rotundatis, marginibus reflexis, nervis obscuris vel subobsoletis; floribus masculinis 5-meris, fasciculatis, axillaribus, sessilibus vel breviter pedicellatis; fructibus depresso-globosis, in sicco valde rugosis, usque ad 4.5 cm diametro.

A tree 10 to 15 m high. Branchlets stout, strongly angled, yellowish-green or yellowish-brown. Leaves elliptical to suborbicular, 8 to 12 cm long, 5 to 10 cm wide, firmly coriaceous, shining, pale-yellowish when dry, the base and apex broad, rounded, the margins reflexed; lateral nerves about 10 on each side of the midrib, obscure or sometimes nearly obsolete; petioles very stout, about 5 mm long. Male flowers in axillary, 4- to 6-flowered fascicles, sessile or shortly pedicellate, 5-merous, greenish-white. Outer two sepals suborbicular, rounded, about 2 mm in diameter, the inner three subreniform, about 3 mm long and 4 mm wide. Petals 5, elliptical to orbicular-elliptical, rounded, about 8 mm long, 6 to 7 mm wide. Filaments connate into five erect, pedicellate bodies, the pedicels flattened, 4 to 5 mm long, 1 mm wide, each bearing at the top from 3 to 6 anthers, the free filaments about 1 mm long. Rudimentary ovary none, the torus spongy. Fruit depressed-globose, when dry strongly wrinkled, 4.5 cm in diameter.

LUZON, Province of Tayabas, Mauban, *For. Bur. 10184 Curran*, March, 1908; Infanta, Tinauan River, *Whitford 757*, September, 1904: Province of Camarines, Daet, *For. Bur. 10731 Curran*, July, 1908.

A very characteristic species, readily recognizable by its elliptical or suborbicular, firmly coriaceous leaves which are broad and rounded at both ends, nearly obsolete nerves, short stout petioles, sessile fasciculate flowers and subglobose fruit. A tree, the trunk 35 cm in diameter, with yellow latex, growing in thickets along the seashore. T., *Gatasan, Danoalan.*

3. **Garcinia dulcis** (Roxb.) Kurz For. Fl. Brit. Burma 1 (1877) 92; Pierre Fl. Forest. Cochinch. Enum. IV; Vesque in DC. Monog. Phan. 8 (1893) 312; King in Journ. As. Soc. Beng. 59^2 (1890) 169.

Xanthochymus dulcis Roxb. Pl. Coromandel 3 (1819) *t. 270;* Wight Icon. *t. 192.*

Garcinia ovalifolia Vidal Rev. Pl. Vasc. Filip. (1886) 53, non Hook. f.

LUZON, Province of Ilocos Sur, *For. Bur. 7103 Klemme:* Province of Zambales, Subic, *Merrill 2074:* Province of Bataan, *For. Bur. 6521 Curran:* Province of Rizal, Tanay, *Bur. Sci. 3326 Ramos*, Bosoboso, *For. Bur. 442, 3295 Ahern's collector:* Province of Camarines Sur, Pasacao, *Ahern 195.* MASBATE, *For. Bur. 997 Clark.* NEGROS, *For. Bur. 5578 Everett; For. Bur. 5224 Danao.* PALAWAN, *Bur. Sci. 618 Foxworthy; For. Bur. 7428 Manalo; For. Bur. 3798 Curran.* MINDANAO, District of Zamboanga, *For. Bur. 9457, 9467, 9471 Whitford & Hutchinson.*

A species widely distributed in the Philippines, and apparently common. The type was from the Moluccas, introduced into the Calcutta Botanical Gardens, and described by Roxburgh from living specimens. The Philippine material agrees closely with the various descriptions and figures of the species, and exactly matches numerous specimens in our herbarium from the Buitenzorg Gardens, so that I have no hesitation in recording the species from the Philippines. It extends from Perak to the Malay Archipelago. T., *Gatasan, Baniti;* II., *Buneg.* Some specimens bear also the names *Tatlang anao* and *Bilucao,* which however properly belong to other species.

4. **Garcinia moselleyana** Pierre Fl. Forest. Cochinch. Enum. X; Vesque in DC. Monog. Phan. 8 (1893) 326.

The type of this species was collected by Mr. Moseley of the Challenger Expedition, on the small islet Malamaui close to the north coast of Basilan, and opposite Isabela de Basilan. I have seen the type in Herb. Kew, but it is rather fragmentary, and seems to be closely matched by *DeVore & Hoover 84,* from the Island of Basilan. *Elmer 7187,* from Palo, Leyte, may be the same, although of this I have only leaf specimens.

5. **Garcinia luzoniensis** sp. nov. § *Mangostana.*

Arbor usque ad 10 m alta; ramis flavidis, teretibus, ramulis nigricantibus, teretibus vel plus minus angulatis; foliis oblongo-ellipticis, breviter obtuse acuminatis, basi acutis, 8 ad 12 cm longis, nervis tenuibus, circiter 35 utrinque; cymis axillaribus, 2 cm longis; floribus masculinis 4-meris; staminibus numerosis, in phalangibus stipitatis dense congestis; pistilli rudimento fungiforme; fructibus globosis, 1.5 cm diametro, 1-locellatis, 1-spermis.

A tree 10 m high or less, the branches terete, rather slender, yellowish, the branchlets blackish, terete or somewhat angled. Leaves oblong-elliptical, 8 to 12 cm long, 2.5 to 4 cm wide, subcoriaceous, dark-colored when dry, shining on both surfaces, the lower surface somewhat paler than the upper, the apex with a short, blunt acumen, the base acute; petioles black, 1 cm long or less; nerves very numerous, slender, about 35 on each side of the midrib, anastomosing, the secondary ones and reticulations nearly as prominent at the primary ones. Inflorescence of axillary, short-peduncled, 2 cm long cymes, in the upper axils only. Male flowers 4-merous, pedicelled. Outer two sepals orbicular-ovate, obtuse, 2 mm long, the inner two orbicular, concave, 3.5 mm in diameter. Petals 4, orbicular or orbicular-elliptic, equaling the inner sepals. Stamens numerous, in four stipitate phalanges opposite the petals, the stipes about 1.5 mm long, the anthers 2-celled, sessile, mostly on the inner face and margins of the phalanges, forming a somewhat flattened head 2 mm in diameter. Rudimentary ovary stipitate, the stipe 1.5 mm long, the stigma rounded, 2.5 mm in diameter, the margin obscurely 4-lobed. Fruit black when dry, globose, smooth, 1.5 cm in diameter, 1-celled, with a single large seed, crowned by the entire, disciform, sessile stigma which is about 5 mm in diameter.

LUZON, Province of Tayabas, Atimonan, *Whitford 678, 739*, August, 1904, in forests at an altitude of from 15 to 100 m

6. **Garcinia eugeniaefolia** Wall. Cat. (1828) no. 4873; Hook. f. Fl. Brit Ind. 1 (1874) 268; King in Journ. As Soc. Beng. 59^2 (1890) 150; Vesque in DC. Monog. Phan. 8 (1803) 343.

MINDORO, *For. Bur. 6762, 6767, 6818, 11398, 11487 Merritt*, March, April, May, 1907–08; *For. Bur. 12195, 12197, 12203 Rosenbluth*, April–June, 1908.

The above specimens agree closely with specimens from Singapore, coll. Ridley, identified with Wallich's species, with specimens from Java named *Garcinia brevirostris* Scheff., and with the various descriptions of the species, and I do not hesitate to refer the Mindoro specimens here. King states that Scheffer's species is identical with Wallich's, and judging from the material before me I consider that he is correct. T., *Basan, Basal;* Mang., *Banotan.*

Penang to Perak, the Andaman Islands, Singapore and Banca; new to the Philippines.

7. **Garcinia dives** Pierre Fl. Forest. Cochinch. Enum. XXXV, *pl. 90 B;* Vesque Epharm. 2: *t. 134, 135;* DC. Monog. Phan. 8 (1893) 360.

Garcinia maingayi Vidal Sinopsis Atlas (1883) 14, *t. 11, f. C*, non Hook. f.

Garcinia bosobosoensis Pierre ex Vesque in DC. Monog. Phan. 8 (1893) 484.

Garcinia cowa Vidal Sinopsis Atlas (1883) *t. 11, f. D;* Rev. Pl. Vasc. Filip. (1886) 53 (?) non Roxb.

Garcinia venulosa Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 97, non Choisy.

LUZON, Province of Pampanga, Arayat, *Merrill 1394, 1407*: Province of Zambales, Cabangan, *Merrill 3004*: Province of Batangas, Looc, *For. Bur. 7644 Curran & Merritt*: Province of Bataan, Lamao River, *For. Bur. 6253, 6404 Curran; For. Bur. 2494, 3062 Borden; Whitford 1240; Williams 704; For. Bur. 2511 Meyer*: Province of Rizal, *For. Bur. 1120, 2651, 2658, 2974 Ahern's collector*: Province of Camarines, *Ahern 259*. PANAY, *Cuming 1659* (type number). MINDANAO, Lake Lanao, *Mrs. Clemens 977, 1008*.

A widely distributed endemic species, previously confused by me with *Garcinia venulosa* (Blanco) Choisy, but to which Blanco's description does not at all closely apply, although the species is sometimes received under the native name cited by him. The species erroneously identified by Vidal as *G. maingayi* Hook f., and of which he figured the staminate flowers, appears to me to be referable here, the drawing seems to have been made from immature specimens, and its accuracy is very doubtful. On this imperfect drawing Pierre based his *Garcinia bosoboscensis*, which is also here reduced to *G. dives*. The specimens referred by Vidal to *Garcinia cowa* Roxb, do not appear to me to be that species, and I have doubtfully referred here, *Garcinia cowa* Vidal, non Roxb., although I am not at all sure that the pistillate flower figured by him as Roxburgh's species, is really that of *Garcinia dives*. The type of *Garcinia dives* is *Cuming 1659*, which according to the Kew list was collected in Panay. The fruits appear to be always 1-celled. Pamp, *Pildis*; T, *Malabilucao, Tatlang anao, Bilucao*, Z, *Panigunuen*.

8. **Garcinia mangostana** Linn. Sp. Pl. (1753) 635; Pl. & Tr. Mém. Guttif. (1862) 170; Pierre Fl. Forest Cochinch. *t. 54*; Vidal Sinopsis Atlas (1883) *t. 11, f. F*; Vesque in DC. Monog. Phan. 8 (1893) 386.

The only Philippine specimen of this species that I have seen is one collected on Mangsi Island by the Wilkes Expedition, and now in the U. S National Herbarium It is commonly cultivated in the Sulu Archipelago, in some parts of southern Mindanao, and in southern Negros. It does not thrive as far north as Manila, but the fruits are to be found in the Manila markets in season, mostly imported from Singapore, rarely from Jolo The mangosteen.

9. **Garcinia benthami** Pierre Fl. Forest. Cochinch. *t. 55, 56*; Vesque Epharm. *2*: *t 109, 110*; DC. Monog. Phan. 8 (1893) 392.

PALAWAN, *For. Bur. 3787 Curran*, February, 1906; *For. Bur. 7430 Manalo*, March, 1907, the former from Agoho Point and the latter from the Bilaran trail: locally known as *Bunog*.

The specimens agree closely with Pierre's figures and description, and also with specimens from trees cultivated in the botanical garden at Buitenzorg.

Cochinchina; new to the Philippines.

10. **Garcinia cumingiana** Pierre Fl. Forest. Cochinch. Enum. XI. *t. 78, f. F. E.*; Vesque in DC. Monog. Phan. 8 (1893) 434.

LUZON, Province of Ilocos Sur, *Cuming 1124* (cotype); *For. Bur. 5661 Klemme*, November, 1906

The only specimen that I have seen that exactly matches Cuming's specimen is *Klemme 5661*, which is from the same province in which Cuming's specimen was collected, according to Cuming's list of localities at Kew. The rudimentary ovary in the staminate flowers is wanting, but otherwise the specimens agree perfectly with those referred to *G. venulosa* below. I suspect that *G. cumingiana* is only a form of Blanco's species, but careful field work and a full series of specimens will be necessary to prove this. Il., *Gatasan*.

11. **Garcinia calleryi** Pierre Fl. Forest. Cochinch. Enum. XV. *t. 79, f. B*; Vesque in DC. Monog. Phan. 8 (1893) 406.

LUZON, Province of Laguna, Calauan, *Callery 56*, in Herb. Mus. Paris.

I have not seen the type of this species, and it is known to me only by the description and figure. Pierre found some flowers which he called neuter, which contained some more or less petaloid staminodes. In all the material I have examined in manifestly allied species, I have found no corresponding flowers. However, I am very doubtful if the species is really distinct from *G. cumingiana* Pierre, and at the same time from *G. venulosa* Choisy. As with the preceding species, careful field work and a complete series of specimens will be necessary to establish the relation of this species to the next.

12. **Garcinia venulosa** (Blanco) Choisy Guttif. Ind. 34; Pl. & Tr. Mém. Guttif. (1862) 172; Pierre Fl. Forest. Cochinch. Enum. XV; Vidal Cat. Pl. Prov. Manila (1880) 18; Phan. Cuming. Philip. (1885) 96; Rev. Pl. Vasc. Filip. (1886) 53; Vesque in DC. Monog. Phan. 8 (1893) 408.

Cambogia venulosa Blanco Fl. Filip. (1837) 435; ed. 2 (1845) 302; ed. 3, 2: 197.

Garcinia cornea F.-Vill. Nov. App. (1880) 16; Vidal Rev. Pl. Vasc. Filip. (1886) 53, non Linn.

Garcinia blancoi Pierre Fl. Forest. Cochinch. Enum. XV, *t. 79, C;* Vesque in DC. Monog. Phan. 8 (1893) 405.

LUZON, Province of Rizal, Bosoboso, *Bur. Sci. 1486 Ramos:* Province of Laguna, Santa Maria Mavitac, *For. Bur. 10110 Curran:* Province of Bulacan, Angat, *For. Bur. 11179 Aguilar:* Province of Batangas, Taal, *For. Bur. 7660 Curran & Merritt:* Province of Tayabas, Laguimanoc, *Merrill 4020:* Province of Sorsogon, *Elmer 7308.* MINDORO, Baco River, *Merrill 1802.* MINDANAO, District of Zamboanga, *For. Bur. 9210 Whitford & Hutchinson;* San Ramon, *Hallier;* Sax River, *Williams 2112.*

This is one of the most widely distributed species in the Philippines, well characterized by its densely nerved leaves, which have peculiar, dark-colored, obscure, very fine, longitudinal reticulations. It is the only species known to me to which Blanco's description at all closely applies. Blanco speaks especially of the terminal inflorescence, the fine veins, the stamens "en mucho número, colocados sobre el germen," and the fruit globose and without ribs, and the above specimens represent the only species known to me having the above combination of characters, while it is common and widely distributed as Blanco states, it being known to him from Batangas, Rizal, Bataan, and the Visayan Islands. I can see no valid reason for distinguishing *Garcinia blancoi* Pierre as a distinct species, and am very doubtful if *G. cumingiana* Pierre and *G. calleryi* Pierre, above, will prove to be distinct when more is known about them, in spite of the different floral characters discovered and figured by Pierre. The native name given by Blanco, *Taolang anac*, does not appear on any of the above specimens, but it is a very loosely applied term, and is found on various sheets representing several other species of the genus. *Garcinia venulosa* was previously erroneously interpreted by me, and many specimens were distributed under this name which are for most part referable to *G. dives* Pierre. T., *Gatasan, Piris;* Moro, *Mangala.*

13. **Garcinia tetrandra** Pierre Fl. Forest. Cochinch. *t. 84 D;* Enum. XX; Vesque Epharm. 2: *t. 143, 144;* DC. Monog. Phan. 8 (1893) 419.

MINDANAO, District of Misamis, *Cuming 1611* (type number): District of Zamboanga, San Ramon, *Copeland 1608*, January, 1905: Lake Lanao, Camp Keithley, *Mrs. Clemens*, June, 1907.

The locality of Cuming's specimens is taken from his own list at Kew, and is undoubtedly correct, as the species has as yet not been found outside of

Mindanao. Pierre gives the locality as "Philippines" but Vesque erroneously adds "Manila."

14. Garcinia rubra sp. nov. § *Oxycarpus.*

Arbor vel arbuscula, 3 ad 10 m alta; ramis ramulisque tenuibus, teretibus; foliis membranaceis, oblongo-ellipticis, usque ad 13 cm longis, apice valde acuminatis, basi acutis, nervis 10 ad 12 utrinque, subtus distinctis, reticulis laxis; floribus masculinis axillaribus, fasciculatis, sessilibus, 4-meris, rubris, circiter 4 mm longis; staminibus 4; ovarii rudimento nullo.

A shrub or small tree, 3 to 10 m high. Branches slender, terete, dark-reddish-brown, more or less wrinkled when dry, the branchlets frequently paler. Leaves membranaceous, oblong-elliptic or oblong, 9 to 13 cm long, 2.5 to 5 cm wide, slightly shining, the apex gradually and rather long slenderly acuminate, the base acute; nerves 10 to 12 on each side of the midrib, distinct, obscurely anastomosing near the margin, the reticulations very lax; petioles slender, 1 cm long or less. Staminate flowers sessile in many-flowered fascicles on warty protuberances in the axils of leaves or more frequently in the axils of fallen leaves, red, cylindrical. Sepals 4, subequal, orbicular-ovate, obtuse, about 2 mm long. Petals 4, 4.5 mm long, about 1.5 mm wide, oblong, obtuse or acute. Anthers 4, basifixed, about 1 mm long, oblong-obovoid, apparently 2-celled, sessile at the apex of the 1 mm long androgynophore; rudimentary ovary none. Fruit depressed-globose, nearly 2 cm thick and 1.5 cm long, when dry with about 7 rather prominent ridges, and with the same number of cells, each with a single seed.

The type of this species was collected by *R. C. McGregor, no. 192,* Baco River, Mindoro, April, 1905, it is represented also by the following specimens from the same locality: *Merrill 4054, For. Bur. 6204, 6208 Merritt,* as well as by additional material from other parts of Mindoro, Mount Halcon, *For. Bur. 4322 Merritt;* Pola, *Merrill 2459;* Abra de Ilog, *For. Bur. 8776 Merritt;* Bongabong River, *Whitford 1375;* Camantigue, *For. Bur. 3657 Merritt;* Paluan, *For. Bur. 9974 Merritt.* From the material available, I can see no valid reason for distinguishing the following: LUZON, Province of Rizal, *Bur. Sci. 2636 Ramos:* Province of Sorsogon, *For. Bur. 10534 Curran.* MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 745,* and one specimen without number.

Garcinia rubra is very similar to *G. binucao* (Blanco) Choisy in gross characters, but the leaves are of different shape, more acuminate, not so much narrowed towards the base, while the male flowers are quite different. The fruit of the two species is similar, but smaller in the present one than in *G. binucao.* It is well characterized by its narrow, red, fascicled four-anthered flowers.

15. Garcinia binucao (Blanco) Choisy Guttif. Ind. 34; Pl. & Tr. Mém. Guttif. (1862) 205; Pierre Fl. Forest. Cochinch. Enum. XXVIII; Vesque in DC. Monog. Phan. 8 (1893) 454; Merr. in Govt. Lab. Publ. 35 (1906) 75; Philip. Journ. Sci. 1 (1906) Suppl. 97.

Stalagmites dulcis Vid. Cat. Pl. Prov. Manila (1880) 18, non Roxb.

Garcinia duodecandra Pierre Fl. Forest. Cochinch. Enum. XXVIII, *t.* 84, *f. B;* Vesque l. c. 443.

Cambogia binucao Blanco Fl. Filip. (1837) 434; ed. 2 (1845) 302; ed. 3,2:197.

Garcinia cambogia F.-Vill. Nov. App. (1880) 16, non Desr.

LUZON, Province of Benguet, Baguio, *Elmer 8944; Bur. Sci. 2498 Mearns;* Sablan, *Elmer 6103:* Province of Zambales, Botolan, *Merrill 2062;* Cabangan, *Merrill 3012:* Province of Bataan, Lamao River, *Whitford 369; For. Bur. 612, 713. 783 Borden:* Province of Tayabas, Guinayangan, *Merrill 2014:* Province of Camarines, Pasacao, *Ahern 78.* MINDORO, *Cuming 1509* (cotype of *G. duodecandra* Pierre). BURIAS, *For. Bur. 1734 Clark.* GUIMARAS, *For. Bur. 218 Gammill.* NEGROS, Himagaan River, *For. Bur. 4257 Everett.*

Like many other species described by Blanco, his *Cambogia binucao* has long been doubtful. I am confident, however, that the above specimens represent his species, as his description applies closely, with the exception of the description of the stamens, and it is the only species known to me to which the name *Biluoao* is applied, and is, moreover, common and widely distributed, especially in the regions from which Blanco secured most of his material. The fruits are edible, and are prominently ridged when dry, as described by Blanco, the latter character confined to very few species so far as the Philippines are concerned. Cuming's specimen, cited above, the type number of *Garcinia duodecandra* Pierre, is the only one I have seen with flowers, the other specimens having fruits, or a few with leaves only. From the material at present at hand, I can see no valid reason for holding *G. duodecandra* Pierre distinct from Blanco's species. T., *Bilucao;* Z., *Baucoc;* V., *Batuan.*

16. **Garcinia mindanaensis** sp. nov. § *Hebradendron.*

Arbor parva vel mediocris, ramulis ramulisque teretibus; foliis ellipticis vel oblongo-ellipticis, papyraceis, utrinque acuminatis vel basi acutis, 13 ad 18 cm longis, nervis utrinque circiter 12, distantibus, laxis; floribus masculinis axillaribus fasciculatis, breviter pedicellatis vel subsessilibus, 4-meris; petalis oblongo-obovatis, 7 mm longis; antheris circiter 20, in capitulo congestis, peltatis.

A small or medium-sized tree. Branches and branchlets terete, olivaceous. Leaves elliptical to oblong-elliptical, papyraceous, 13 to 18 cm long, 4 to 8 cm wide, somewhat shining, the apex rather strongly acuminate, rarely subacute, the base slightly acuminate or acute; nerves about 10 on each side of the midrib, rather distant, ascending, anastomosing, the reticulations lax; petioles 1 to 1.5 cm long. Staminate flowers in axillary fascicles, red, the buds globose, the pedicels very short. Outer two sepals reniform, 2.5 mm long and 5 mm wide, the inner two orbicular, 4 to 5 mm in diameter. Petals 4, in anthesis oblong-obovate, about 7 mm long. Stamens about 20, united into a 4-angled or rounded mass about 2.5 mm in diameter; anthers rounded, peltate, sessile, their dehiscence circumscissile; rudimentary ovary none. Fruit (immature) ovoid, small.

MINDANAO, Lake Lanao Camp Keithley, *Mrs. Clemens s. n.*, March, 1907, and *no. 467*, April, 1906, as well as three other unnumbered sheets.

17. **Garcinia lateriflora** Blume Bijdr. (1825) 214; Walp. Repert. 1 (1842) 394; Choisy Guttif. Ind. 37; Pl. & Tr. Mém. Guttif. (1862) 357; Pierre Fl. Forest. Cochinch. Enum. XXXII, *pl. 85, f.* C^1, C^2; Vesque Epharm 2: *t. 127, 128;* DC. Monog. Phan. 8 (1893) 474.

CAMIGUIN (Babuyanes), *Bur. Sci. 4043 Fénix.* LUZON, Province of Tayabas (Principe), Baler, *Merrill 1037:* Province of Bataan, Lamao River, *For. Bur. 615,* *712 Borden; Bur. Sci. 1574, 1575 Foxworthy*, October, 1906: Province of Rizal, Tanay, *Bur. Sci. 3280 Ramos*: Province of Tayabas, Lucban, *Elmer 8048*.

From the material at present available I can see no sufficient reason for separating the above specimens from Blume's species, hitherto known only from Java. They agree very closely with authentic material in our herbarium, received from the Botanical Garden at Buitenzorg, and also closely with the various descriptions of the species. None of the Philippine material has pistillate flowers, but the male flowers and fruits answer the description closely, while the arrangement of the staminodes in the female flowers is the same as in Blume's species, as shown in specimens with immature fruits. T., *Tatlang anac*; in Baler, *Paglá*.

PHILIPPINE ERICACEÆ.

By Elmer D. Merrill.
(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

This family is represented in the Philippines by four known genera, *Rhododendron, Vaccinium, Gaultheria* and *Diplycosia*, all of wide geographic distribution, except the last which is confined to the Indo-Malayan region. About forty species are already known from the Archipelago, mostly confined to *Rhododendron,* 16 species, and *Vaccinium,* 19 species, while the two remaining genera have two species each.

Without exception our species of this family are plants of medium and higher altitudes, generally occurring on exposed ridges of the higher mountains and above an altitude of 1,000 m, although a few species have been found in Mindoro and Mindanao in very humid localities, at lower altitudes. On many of the higher mountains the predominating species in the elfinwood on the exposed ridges belong to *Vaccinium* and *Rhododendron,* and some species of these genera are found in the more sheltered ravines. The two species of *Gaultheria* are always terrestrial as well as most of *Vaccinium* and many of *Rhododendron.* The species of *Diplycosia* may be either terrestrial, subscandent, or suberect terrestrial shrubs, or under certain circumstances pseudo-parasitic. *Vaccinium* ranges from small plants a few inches in height (*V. microphyllum*) to trees often 20 or 25 feet in height (*V. cumingianum*), being mostly terrestrial, although some species appear to be indifferently terrestrial or epiphytic, while at least one, *V. vidalii,* has the strangling habit of most species of *Ficus* of the section *Urostigma. Rhododendron* does not show so great a range in size as does *Vaccinium,* the smallest one that I have seen being about two feet in height, but epiphytic species are more abundant than in the latter genus.

Of the thirty-nine species below enumerated in the four genera, thirty-six are confined to the Philippines, so far as can be determined at present; shewing a remarkably high percentage of endemism. An examination of the table given below, giving the distribution of the species of *Rhododendron* and *Vaccinium* of China, Formosa, and Malaya, including New

Guinea, will prove that the endemism is nearly as great in all these regions as it is in the Philippines.

	Rhododendron.		*Vaccinium.*	
	Total.	Endemic.	Total.	Endemic.
Borneo	20	16	8	5
Java	8	1	11	4
Malay Peninsula	8	4	10	4
Sumatra	11	3	4	0
Celebes	3	1	4	0
New Guinea	19	19	9	9
China	135	125	16	13
Formosa	6	3	3	2
Philippines	16	16	19	18

Of the Philippine species, *Gaultheria cumingiana* has been found in Formosa, and *G. borneensis* in Luzon, Borneo and apparently also in Formosa. *Vaccinium microphyllum* Bl. is found in Celebes, Ternate, and probably also in Borneo and the Malay Peninsula, although its exact distribution is a matter of some doubt. The remaining species are mostly local in distribution, but some, notably *Vaccinium villarianum*, *Rhododendron quadrasianum*, and *R. kochii* are found on most, if not all high mountains from northern Luzon to southern Mindanao, thus supplying some evidence as to the homogeneity of the Archipelago.

The presence of these numerous species of *Ericaceæ* on the mountains of the Philippines, indicates the subtemperate nature of the vegetation of the higher peaks, a character of the higher mountains of the entire Malayan region.

Several genera of the family are found in Formosa, southern China, the Malay Peninsula and in Borneo that have not as yet been found in the Philippines, and some of these, especially *Agapetes*, may be expected to be found later in the Archipelago.

KEY TO THE GENERA.

Ovary inferior; fruit a berry.......... 1. *Vaccinium*
Ovary superior; fruit a capsule.
  Capsule 5-valved, loculicidal; calyx surrounding the capsule and succulent in fruit; flowers small; plants usually aromatic.
    Anthers with two horns at the apex.......... 2. *Gaultheria*
    Anthers not horned at the apex.......... 3. *Diplycosia*
  Capsule septicidal; calyx not enlarged and succulent in fruit; anthers dehiscing by pores; flowers medium or large.......... 4. *Rhododendron*

1 VACCINIUM Linn

- Flowers axillary, solitary or fascicled
  - Leaves less than 2 cm long
    - Leaves entire — 1 *V microphyllum*
    - Leaves crenate — 2 *V whitfordii*
  - Leaves 5 to 10 cm long
    - Flowers 5 mm long or less — 3 *V lanaense*
    - Flowers about 1 5 cm long — 4 *V apoanum*
- Flowers in axillary racemes
  - Leaves 5 cm long or less
    - Leaves obtuse, acute or slightly acuminate, never caudate acuminate
      - Leaves 4 to 5 cm long
        - Leaf margins somewhat glandular, anthers not awned — 5 *V banksii*
        - Leaf margins not glandular anthers with two prominent dorsal awns — 6 *V palawanense*
      - Leaves 3 cm long or less
        - Leaves obtuse at the apex — 7 *V pyriforme*
        - Leaves acute or somewhat acuminate at the apex
          - Leaves at least one half as wide as long, oval — 8 *V villarii*
          - Leaves more than twice as long as broad, oblong to oblong lanceolate
            - Racemes usually much longer than the leaves, pedicels 1 to 1 5 cm long, leaf margins more or less glandular — 9 *V vidalii*
            - Racemes usually shorter than the leaves pedicels less than 1 cm long, leaf margins not glandular — 10 *V cumingianum*
    - Leaves long caudate acuminate
      - Young branches and racemes more or less pubescent and with numerous pedicellate capitate glands — 11 *V tenuipes*
      - Young branches and racemes glabrous — 12 *V caudatum*
  - Leaves exceeding 5 cm in length
    - Leaves distinctly petioled petiole usually about 1 cm long always 5 mm long or more
      - Flowers 1 5 to 2 cm long
        - The whole plant glabrous — 13 *V barandanum*
        - Leaves and inflorescence pubescent — 14 *V indutum*
      - Flowers 1 cm long or less
        - The whole plant glabrous
          - Bracts, if any, caducous — 15 *V benguetense*
          - Bracts prominent, persistent — 16 *V philippinense*
        - Inflorescence capitate glandular — 17 *V luzoniense*
    - Leaves subsessile or shortly petioled, petiole never exceeding 5 mm in length, leaf apex acute or slightly acuminate
      - Inflorescence glabrous, leaves sessile or subsessile — 18 *V jagorii*
      - Inflorescence and fruits somewhat pubescent leaves distinctly petioled — 19 *V halconense*

1 **V. microphyllum** Blume Bijdr (1826) 851, Miq Mus Bot Lugd Bat 1 (1863) 38, Merr in Philip Journ Sci 1 (1906) Suppl 221

V mindorense Rendle in Journ Bot 34 (1896) 355, Merr in Philip Journ Sci 2 (1907) Bot 293

MINDORO, Mount Halcon (Dulangan), *Whitehead* in Herb Mus Brit, *Merrill 5676; For Bur 4414 Merritt* PANAY, Mount Madiaas *Yoder* MINDANAO, District of Davao, Mount Apo, *Copeland 1037, 1417* and s n.

This is a critical species, the exact range of which outside of Celebes and the Philippines is somewhat doubtful, but extending to Borneo, Malacca and Perak according to King and Gamble. I had previously identified the small congested form from the summit of Mount Apo with Blume's species, but an examination of his type in Herb Leiden shows that the lax form, typified by *Vaccinium mindorense* Rendle, is closer to it. From the notes I made on the types of *V. mindorense* and *V. microphyllum*, and from a reëxamination of the Philippine material I can not find any distinguishing characters, and accordingly have here reduced Rendle's species. On Mount Halcon, according to my own observations, and on the Cuernos Mountains in Negros, according to Elmer, the species occurs both as an epiphyte and terrestrial, and I have both terrestrial and epiphytic forms from Mount Apo. At first sight the Apo epiphytic form appears to be very different from the terrestrial one, but careful examination shows no distinguishing characters except vegetative ones, the terrestrial form occurring at higher altitudes in exposed situations and naturally having smaller and more densely crowded leaves than has the epiphytic form, while the whole plant is much congested.

Diplycosia microphylla Becc., was described by Beccari without any reference to *Vaccinium microphyllum* Blume, but was considered by Hooker f. to represent Blume's species, in which he was followed by King and Gamble. It is possible that Hooker f. was correct and that *Diplycosia microphylla* Becc. is really the same as Blume's species. Unfortunately I have no specimens for comparison and this question will have to be determined at a later date.

2. **V. whitfordii** Merr. in Philip. Journ. Sci. 2 (1907) Bot. 295.

LUZON, District of Lepanto, near Balbalasan, *For. Bur. 5741 Klemme*, November, 1906, alt. 1,500 m. MINDORO, Mount Halcon, *Merrill 5798*, November, 1906, alt. 2,400 m. NEGROS, Mount Silay, *Whitford 1534*, May, 1906, alt. 1,000 to 1,200 m.

An erect terrestrial and epiphytic shrub 0.7 to 3 m high, in vegetative characters closely resembling the Bornean *Vaccinium coriaceum* Hook., but differing from that species in its axillary solitary flowers, *V. coriaceum* having 8- to 10 flowered racemes.

3. **V. lanaense** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 161.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 431*, March, June, 1906, and six sheets without number, September, October, 1906–07.

Epiphytic or pseudo-epiphytic on *Ficus*, altitude about 800 m.

4. **V. apoanum** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 39.

MINDANAO, District of Davao, Mount Apo, *Copeland 1105*, April, 1904; *Williams 2550*, March, 1905, alt. 1,900 to 2,300 m: Province of Misamis, Mount Malindang, *For. Bur. 4708 Mearns & Hutchinson*, May, 1906, alt. 1,800 m. PANAY, Mount Midiaas, *Yoder*, April, 1905. NEGROS, Mount Silay, *Whitford 1497*, May, 1906, alt. 1,000 to 1,200 m.

5. **V. banksii** Merr. in Govt. Lab. Publ. (Philip.) 35 (1906) 45; Philip. Journ. Sci. 2 (1907) Bot. 293.

NEGROS, Canlaon Volcano, *Banks*, March, 1902, altitude 1,300 to 1,350 m. MINDORO, Mount Halcon, *Merrill 5506*, November, 1906, altitude 2,400 m.

The Mindoro specimen differs from the type in having a glabrous inflorescence, somewhat broader flowers and longer filaments which are prominently pilose. Additional material may prove it to be distinct.

6. Vaccinium palawanense sp. nov.

Arbor parva usque ad 6 m alta, inflorescentia excepta glabra; foliis late oblanceolatis vel elongato-elliptico-oblanceolatis, coriaceis, nitidis, circiter 5 cm longis, basi cuneatis, apice breviter obtuse acuminatis, marginibus revolutis, integris; racemis axillaribus, folia aequantibus, sparse pubescentibus; floribus circiter 8 mm longis; corolla tubulari, medio plus minus inflata, ore vix contracta; staminibus 10; antheris dorso 2-aristatis, appendicibus tubulosis, circiter 0.5 mm longis, poris orbicularibus dehiscentibus.

A small tree or shrub reaching a height of about 6 m, the trunk 12 cm in diameter, glabrous except the inflorescence. Branches terete, glabrous, grayish, the branchlets somewhat angled. Leaves broadly oblanceolate or oblong-elliptical-oblanceolate, about 5 cm long, 1 to 1.8 cm wide, coriaceous, brownish when dry, glabrous, the upper surface shining, the lower dull and somewhat glandular-punctate, the apex shortly and obtusely acuminate, the base gradually narrowed, cuneate, the margins entire, rather strongly recurved; lateral nerves 2 or 3 on each side of the midrib, not distinct, ascending, the reticulations nearly obsolete, petioles stout, about 2 mm long. Racemes axillary, solitary, about as long as the leaves, somewhat pubescent, each with from 6 to 14 flowers. Flowers white to light-pink, fragrant, their pedicels 5 to 7 mm long, articulated with the calyx. Calyx tube subglobose, 2 mm long, the lobes 5, ovate, acute, about 1.4 mm long, their margins slightly ciliate. Corolla tubular, about 8 mm long, 3 mm in diameter, somewhat swollen at about the middle, the mouth not contracted; lobes 5, erect, broadly triangular-ovate, somewhat auricled at the base, less than 1 mm long. Stamens 10, inserted on the base of the corolla; filaments nearly 3 mm long, lanate; anthers 1.5 mm long, the dorsal awns two, erect, slender, curved, about 0.8 mm long, the apical tubes cylindrical, about 0.5 mm long, opening by terminal pores. Disk glabrous, tumid; style 7 to 8 mm long, slightly pubescent; ovary 5-celled.

PALAWAN, Mount Victoria, *Bur. Sci. 696 Foxworthy*, March 23, 1906, on rocky slopes along streams at an altitude of about 1,000 m. A form of the same species is apparently represented by *Bur. Sci. 649 Foxworthy*, same locality, but from an altitude of 1,750 m, a shrub 1.5 to 2 m high on exposed ridges, which differs from the type in having somewhat more pubescent racemes and shorter dorsal awns on the anthers.

A species with much the appearance of *Vaccinium banksii* Merr., but differing in many characters, notably in the presence of dorsal awns on the anthers, these being absent in *V. banksii.*

7. V. pyriforme Merr. in Philip. Journ. Sci. 2 (1907) Bot. 295.

MINDORO, Mount Halcon, *For. Bur. 4424 Merritt*, June, 1906, an epiphytic scandent or subscandent shrub, altitude 1,600 m.

A species resembling *Vaccinium microphyllum* in habit and vegetative characters but at once distinguished by its racemose inflorescence.

8. **V. villarii** Vidal Rev. Pl. Vasc. Filip. (1886) 166; Ceron Cat. Pl. Herb. Manila (1892) 105; Merr. in Philip. Journ. Sci. 2 (1907) Bot. 294.

V. microphyllum F.-Vill. Nov. App. (1883) 121, non Reinw.

V. varingiaefolium Vidal Sinopsis Atlas (1883) *t. 60, f. D*, non Miq.

LUZON, Province of Benguet, Baguio, *For. Bur. 951 Barnes*, May, 1904; *Merrill 1166*, January, 1903; *Williams 1156, 1458*, June, September, 1904; *Elmer 5955*, March, 1904; *Topping 56*, January, 1903; *Bur. Sci. 4274, 2830 Mearns*, April and July, 1907, common in open grass-lands 1,500 to 2,000 m alt.: Provinces of Tayabas and Laguna, Mount Banajao, *Bur. Sci. 2390 Foxworthy*, March, 1907; *For. Bur. 7891 Curran & Merritt*, November, 1907; *Bur. Sci. 6063 Robinson*, March, 1908, exposed ridges at about 2,200 m alt.: Province of Albay, Mayon Volcano, *Bur. Sci. 2949 Mearns*, June, 1907; *Bur. Sci. 6493 Robinson*, September, 1908, alt. 1,000 m. MINDORO, Mount Halcon, *Merrill 5508*, exposed ridges at 2,400 m alt. MINDANAO, District of Davao, Mount Apo, *Copeland 1052, 1418*, April and October, 1904; *Williams 2576*, March, 1905, 2,000 to 3,000 m.

Variable in size, usually less than 1 m high, but sometimes higher, found at high altitudes from northern Luzon to southern Mindanao, the fruit edible, well flavored. By typographical errors Vidal describes the leaves as 10 to 25 cm long, and the calyx tube as 3 cm long, which should be read as mm in each case.

9. **Vaccinium vidalii** Merrill & Rolfe sp. nov.

Arbuscula subglabra 2.5 ad 4 m alta; foliis oblongo-ovatis, elliptico-ovatis, vel oblongo-lanceolatis, coriaceis, nitidis, supra glabris, subtus glabris vel in costa sparse pilosis, 2.5 ad 3 cm longis, basi acutis, apice obtuse acuminatis; racemis axillaribus, folia aequantibus vel superantibus, paucifloris; floribus longe pedicellatis; corolla cylindraceo-urceolata, circiter 4 mm longa; staminibus 10; antheris productis, poris apicaliter dehiscentibus, dorso aristatis.

A nearly glabrous shrub 2.5 to 4 m high. Branches and branchlets glabrous, terete, gray or reddish-brown. Leaves alternate, coriaceous, oblong-ovate, elliptical-ovate or oblong-lanceolate, 2.5 to 3 cm long, 0.8 to 1.5 cm wide, the upper surface glabrous, very shiny, the lower surface dull or shining, glabrous, or the midrib slightly pilose, the base acute, the apex shortly and obtusely acuminate, the margins entire, usually with rather prominent marginal glands simulating teeth; nerves nearly obsolete, the reticulations entirely so; petioles 2 mm long or less, sometimes slightly pubescent. Racemes axillary, solitary, 5 cm long or less, glabrous, each with from two to six long-pedicelled flowers, the pedicels 1 to 1.5 cm long. Calyx-tube broadly ovoid, the teeth 5, small. Corolla cylindrical-urceolate, about 4 mm long, 3 to 3.5 mm in diameter, slightly contracted above, the lobes 5, ovate, acute, reflexed, about 1 mm long. Stamens 10; filaments lanate, attenuate above; anthers 2 mm long, each with two, slender, 0.6 mm long awns on the back, the apical tubes nearly 1 mm long, opening by slightly oblique, orbicular pores. Disk prominent, densely pubescent. Style 3 mm long, glabrous. Fruit globose, 4 mm in diameter, glabrous except the persistent pubescent annulus.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8258 Curran & Merritt*, December, 1907; *Bur. Sci. 4765, 5132 Ramos*, same date.

A species growing on exposed ridge-forests at an altitude of about 1,400 m, epiphytic or pseudo-epiphytic, having the strangling habit of most species of *Ficus* of the section *Urostigma*. It has also been collected by Vidal in the Caraballo Mountains, Province of Nueva Ecija, Luzon, no. 3144 in Herb. Kew.

In many respects the present species resembles *Vaccinium cumingianum* Vidal, but differs especially in its relatively broader leaves, different flowers and lax racemes.

10. **V. cumingianum** Vidal Rev. Pl. Vasc. Filip. (1886) 167; Ceron Cat. Pl. Herb. Manila (1902) 105; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 112.

V. sp. (*aff. V. coriaceum*) Vidal Sinopsis Atlas (1883) *t. 60, f. C.*

LUZON, Province of Benguet, *Loher 5077;* Pauai, *Bur. Sci. 4404 Mearns*, July, 1907; Mount Tonglon (Santo Tomas), *Merrill 4817; Elmer 5804:* Province of Zambales, Mount Pinatubo, *Bur. Sci. 2535 Foxworthy*, April, 1907: Mount Tapulao, *Bur. Sci. 4783, 5093 Ramos*, December, 1907: Province of Pampanga, Mount Abu, *Bur. Sci. 1911 Foxworthy*, December, 1906: Provinces of Tayabas and Laguna, Mount Banajao, *Cuming 805* (type number); *Elmer 9212; For. Bur. 7893, 7882, 7889 Curran & Merritt; Whitford 963; For. Bur. 878 Klemme:* Province of Bataan, Mount Mariveles, *For. Bur. 1330, 1558 Borden; Whitford 245, 459; For. Bur. 2649 Meyer; Merrill 281*, Dec. Philip. Forest Fl.: Province of Albay, Mount Mayon, *Bur. Sci. 6501 Robinson*, September, 1908, alt. 1,100 m.

A tree 5 to 8 m high growing on exposed ridges at from 1,000 to 2,250 m alt.

11. **Vaccinium tenuipes** sp nov.

Arbuscula epiphytica vel terrestris usque ad 3 m alta; ramulis racemisque plus minus pubescentibus et capitellato-stipitato-glandulosis; foliis coriaceis, ovatis, oblongis, vel oblongo-lanceolatis, 3 ad 5 cm longis, basi rotundatis, apice longe caudato-acuminatis; racemis axillaribus, folia aequantibus vel superantibus, tenuibus; floribus longe pedicellatis, corolla 1 cm longa, anguste conico-urceolata; staminibus 10; antheris vix productis, poris orbicularibus dehiscentibus.

A terrestrial or epiphytic shrub about 3 m high. Branches terete, glabrous, gray or blackish when dry, the branchlets slender, somewhat pubescent, and with numerous, long, spreading, capitellate-glandular hairs, which are also found on the inflorescence. Leaves alternate, ovate to oblong or even oblong-lanceolate, 3 to 5 cm long, 1 to 2.5 cm wide, coriaceous, shining, glabrous, brown when dry, the base rounded, the apex long and slenderly caudate-acuminate, the acumen usually one-third the length of the leaf, the margins strongly recurved; nerves obsolete or nearly so; petioles about 3 mm long, glabrous. Racemes axillary, solitary, about as long as the leaves, very slender, few-flowered, somewhat pubescent and with numerous spreading capitate-glandular hairs, the pedicels slender, 1 to 2 cm long, each with one or two lanceolate, acuminate, about 1.5 mm long bracts in the lower part. Calyx-tube short, the lobes 5, triangular-ovate, acute or slightly acuminate, about 1.5 mm long. Corolla pink or red, glabrous, narrowly conical-urceolate, 1 cm long, about 4.5 mm in diameter below, the upper half narrowed and about 2 mm in diameter above, the lobes 5, broadly ovate, obtuse, 1 mm long, erect. Stamens 10, inserted on the base of the corolla; filaments 3 mm long, lanate below, attenuate above; anthers oblong, 1.5 mm long, the apex not produced, truncate, opening by two orbicular pores, the back not spurred. Disk prominent, rugose, glabrous or nearly so; style stout, 1 cm long, somewhat pilose.

LUZON, Province of Cagayan, Caua Volcano, *R. N. Clark*, August, 1908, altitude about 900 m. MINDORO, Ibalo River, *For. Bur. 11486 Merritt*, May, 1908, altitude about 600 m; Mount Halcon, *Merrill 6133*, November, 1906, sterile, altitude about 1,500 m. NEGROS, Cuernos Mountains, *Elmer 9819, 10108*, altitude about 1,200 m.

A species of the section *Epigymum*, well characterized by its very strongly caudate acuminate, almost nerveless leaves, very slender few-flowered axillary racemes and long pedicelled flowers, and especially by the numerous, long, capitate-glandular hairs on the young branches and inflorescence.

12. **V. caudatum** Warb. in Perk. Frag. Fl. Philip. (1905) 173.

PHILIPPINES, without locality, *Cuming 905*, type number, (Province of Albay, ex Cuming's list in Herb. Kew).

A species manifestly closely allied to *Vaccinium benguetense* Vidal, and differing from that species only in some minor characters, slightly smaller leaves and somewhat shorter petioles, obscure nerves and glabrous filaments. The only specimens I have seen are those collected by Cuming, one of which is before me.

13. **V. barandanum** Vidal Rev. Pl. Vasc. Filip. (1886) 169; Ceron Cat. Pl. Herb. Manila (1892) 105.

V. hutchinsonii Merr. in Philip. Journ. Sci. 2 (1907) Bot. 294.

LUZON, District of Lepanto, Mount Data, *Merrill 4580; For. Bur. 5672 Klemme*: Province of Benguet, *Loher 3779*; Mount Santo Tomas, *Elmer 5806*; Baguio, *For. Bur. 971 Barnes*. MINDORO, Mount Halcon, *Merrill 5524*.

This species grows at altitudes of from 1,500 to 2,250 m and is usually a terrestrial shrub or small tree 4 to 8 m high, although on Mount Halcon it grows as an epiphyte. It is distinguished among the Philippine species by its relatively large flowers which are 1.5 cm to 2 cm long. *Vaccinium hutchinsonii*, I am convinced, is only a broad leaved form of Vidal's species, and is accordingly here reduced. The type of *V. barandanum* Vid. was from the District of Lepanto, Luzon.

14. **V. indutum** Vidal Rev. Pl. Vasc. Filip. (1886) 169.

LUZON, District of Bontoc, *Vidal 1831*, in Herb. Kew.

This species has been collected but once, and is characterized by its tomentose leaves and inflorescence. According to Vidal, it is closely allied to *V. barandanum*, and as Vidal does not give the length of the flowers, it has been assumed, in making the key to the species, that they are about the same as in *V. barandanum*.

15. **V. benguetense** Vidal Rev. Pl. Vasc. Filip. (1886) 168; Ceron Cat. Pl. Herb. Manila (1892) 105.

LUZON, Province of Benguet, *Vidal 1515* (type), *1534*, in Herb. Kew; *Loher 3781*; Baguio, *Elmer 8663*; Bugias, *Merrill 4655*: Province of Zambales, Mount Pinatubo, *Bur. Sci. 2564, 2566, 2579 Foxworthy*; Mount Tapulao, *Bur. Sci. 4988*

Ramos. MINDORO, Magasanantubig River, *For. Bur. 12033 Merritt; For. Bur. 12194 Rosenbluth.*

The Benguet specimens are from altitudes of 1,500 m or above, while those from Zambales are from 700 to 800 m. The Mindoro specimens were collected at an altitude of about 200 m, and differ in having smaller, thinner and less prominently veined leaves than the type, in vegetative characters being very similar to *Vaccinium caudatum* Warb., but they have the lanate filaments of *V. benguetense*. A tree 7 to 12 m high.

16. **Vaccinium philippinense** Warb. in Perk. Frag. Fl. Philip. (1905) 174.

LUZON, without locality, *Cuming 832*, type number, (Province of Tayabas, Luzon, ex Kew List).

The only specimens of this species that I have seen are those collected by Cuming, one of which is in our herbarium. It is very closely allied to *Vaccinium benguetense* Vidal, apparently differing chiefly in its persistent bracts and slightly more prominent calyx-teeth.

17. **V. luzoniense** Vidal Rev. Pl. Vasc. Filip. (1886) 168; Ceron Cat. Pl. Herb. Manila (1892) 105.

LUZON, Province of Benguet, Loo, *Loher 3775;* Baguio, *For. Bur. 5143 Curran; Williams 1296*, altitude 1,500 to 2,250 m.

The type of this species, *Vidal 1535*, was from the District of Lepanto, Luzon, and it seems to be closely matched by the specimens cited above. The species can be readily recognized by the peculiar capitate-glandular hairs of the inflorescence, this character being found in only one other known Philippine species, the very different *V. tenuipes* above described.

18. **V. jagori** Warb. in Perk. Frag. Fl. Philip. (1905) 174; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 112.

LUZON, without locality, *Jagor 852*, type in Herb. Berol.: Province of Zambales, Mount Tapulao, *Bur. Sci. 5024 Ramos; For. Bur. 9503, 9512 Curran & Merritt*, December, 1907, alt. 1,400 to 2,000 m: Province of Bataan, Mount Mariveles, *Bur. Sci. 1654, 1655 Foxworthy; Elmer 7026; Whitford 145, 1101; Merrill 3955; For. Bur. 2623 Meyer*, alt. 1,050 to 1,350 m.

A small tree, 6 to 10 m high, growing on exposed ridges at altitudes of from 1,050 to 2,000 m, recognizable by its nearly sessile leaves. I have seen the type of the species in the Berlin Herbarium, and the above specimens agree closely with it.

19. **V. halconense** Merr. in Philip. Journ. Sci. 2 (1907) Bot. 293.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8101 Curran & Merritt*, December, 1907; *Bur. Sci. 4697 Ramos*, alt. 1,400 to 1,700 m. MINDORO, Mount Halcon, *For. Bur. 4422 Merritt*, June, 1906; *Merrill 5665*, November, 1906, alt. 1,350 to 1,600 m.

A species manifestly allied to *Vaccinium jagori* Warb., but distinguished by its pubescent inflorescence and fruits, and distinctly petioled leaves.

2. GAULTHERIA Linn.

Leaves ovate, acuminate, 3 to 9 cm long.......................... 1. *G. cumingiana*

Leaves oblong or narrowly obovate-oblong, acute or obtuse, less than 1.5 cm in length.......................... 2. *G. borneensis*

1. **G. cumingiana** Vidal Rev. Pl. Vasc. Filip. (1886) 170; Phan. Cuming. Philip. (1885) 184; Ceron Cat. Pl. Herb. Manila (1892) 105; Merr. in Philip. Journ. Sci. 2 (1907) Bot. 292; Hayata in Bot. Mag. Tokyo 20 (1906) 72; Journ. Coll. Sci. Tokyo 25^{19} (1908) 150.

LUZON, District of Lepanto, near Balbalasan, *For. Bur. 5698 Klemme*, alt. 1,600 m: Province of Benguet, Baguio, *Williams 951;* Pauai, *Bur. Sci. 4277 Mearns;* Mount Tonglon (Santo Tomas), *Elmer 6253; For. Bur. 4958 Curran;* Baguio to Ambuklao, *Merrill 4376;* Bugias, *Merrill 4672:* Province of Laguna, Mount Banajao, *For. Bur. 7896, 8009 Curran & Merritt*, November, 1907: Province of Albay, Mayon Volcano, *Bur. Sci. 2923 Mearns; Bur. Sci. 6500 Robinson*. MINDORO, Mount Halcon, *Merrill 5725*.

Widely distributed in the highlands of north-central Luzon, at altitudes of from 1,500 to 2,250 m, also at high altitudes on other mountains in southern Luzon and in Mindoro. It has been collected several times in Formosa.

2. **G. borneensis** Stapf in Trans. Linn. Soc. Bot. II 4 (1894) 190, *pl. 15, f. C, 4–6;* Rendle in Journ. Bot. 34 (1896) 355.

LUZON, Province of Benguet, Pauai to Baguio, *Merrill 4796*, altitude 1,800 m; Pauai, *Bur. Sci. 4283, 4286 Mearns*, July, 1907, altitude about 2,200 m.

This species was originally described and figured from material collected on Mount Kinabalu, British North Borneo, and soon afterwards was collected in northern Luzon by Whitehead and reported from the Philippines by Rendle. I have examined the type of the species in Herb. Kew, and can see no valid reason for distinguishing the Philippine form even as a variety. Judging from the description and figure, the Formosan species *G. itoana*, recently described by Hayata, is quite the same as the Bornean and Luzon form. *G. borneensis*, as noted by Stapf, is allied to *Gaultheria antipoda* of Tasmania and New Zealand. Other species confined to Formosa, Luzon, and Borneo are *Boea swinhoii* Hance, *Euphrasia borneensis* Stapf, and *Mallotus playfairii* Hemsl.

3. DIPLYCOSIA Blume.

Leaves and branches glabrous, the pedicels obscurely pubescent . 1. *D. merrittii*
Leaves and branches with few or many, long setose hairs .. . . 2. *D. luzonica*

1. **D. merrittii** Merr. in Philip. Journ. Sci. 2 (1907) Bot. 293.

MINDORO, Mount Halcon, *For. Bur. 4413, 4415, 4437 Merritt*, June, 1906; *Merrill 5670*, November, 1906, altitude 1,400 to 1,700 m. PALAWAN, Mount Victoria, *Bur. Sci. 666 Foxworthy*, March, 1906, altitude 1,100 m.

2. **D. luzonica** (A. Gray) Merr. in Philip. Journ. Sci. 2 (1907) Bot. 293.

Gaultheria luzonica A. Gray in Proc. Amer. Acad. 5 (1861) 324.

Diplycosia scandens Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 219.

LUZON, District of Lepanto, Balbalasan, *For. Bur. 5693 Klemme*, November, 1906, alt., 1,600 m; Mount Data, *Merrill 4597*, November, 1905, altitude 2,250 m, type of *D. scandens:* Province of Benguet, Mount Santo Tomas, *Elmer 5932; Williams 1341*, altitude about 2,200 m: Province of Laguna, Mount Banajao, *Wilkes Expedition*, in U. S. Nat. Herb. (type); *For. Bur. 7884, 7892 Curran & Merritt*, November, 1907, altitude about 2,200 m. MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4779 Mearns & Hutchinson*, May, 1906.

An endemic species like the preceding, widely distributed in the Philippines at higher altitudes. The species described by me as *D. scandens*, is certainly only a form of *D. luzonica*, with somewhat thinner leaves and rather more hairy branches and leaves than the type.

4 RHODODENDRON Linn

Leaves acuminate or acute
Leaves and branches densely appressed hirsute setose 1 *R subsessile*
Leaves and branches glabrous or at most only lepidote
Flowers 3 cm long or less
Flowers 1 5 to 2 cm long red leaves 6 cm long 2 *R apoanum*
Flowers 3 cm long yellow leaves 8 to 10 cm long 3 *R xanthopetalum*
Flowers 3 5 to 6 cm long
Leaves very densely brown lepidote beneath flowers tubular crimson about 5 cm long 4 *R nortonae*
Leaves glabrous beneath or with scattered lepidote scales only
Ovary rather densely hirsute 5 *R kochii*
Ovary glabrous
Corolla white 3 5 to 4 cm long leaves sharply acuminate 6 *R schadenbergii*
Corolla red 5 to 6 cm long leaves acute or slightly acuminate dull 7 *R spectabile*
Corolla yellow 4 5 to 5 cm long leaves acute or slightly acuminate rarely obtuse shining 8 *R clementis*
Leaves obtuse rounded or emarginate
Flowers 3 to 4 5 cm long white
Flowers 3 cm long subcampanulate leaves usually 2 5 to 4 5 cm long rarely 5 5 cm in length 9 *R vidalii*
Flowers 4 to 4 5 cm long infundibuliform leaves 6 to 8 cm long 10 *R mindanaense*
Flowers 4 cm long the corolla tubular slender leaves 4 to 6 cm long 11 *R copelandi*
Flowers 2 to 2 5 cm long red
Flowers 2 5 cm long campanulate
Leaves oblong obovate or oblong oblanceolate 2 5 to 5 5 cm long 12 *R curranii*
Leaves obovate or orbicular obovate rarely oval 2 5 to 5 5 cm long 13 *R whiteheadii*
Flowers 2 cm long tubular leaves narrowly oblong obovate 14 *R malindangense*
Flowers 1 5 cm long or less
Flowers mostly 1 5 cm long leaves 5 to 9 mm wide sometimes narrower narrowly obovate oblong 15 *R quadrasianum*
Flowers mostly about 1 cm long leaves linear oblong mostly 2 to 4 mm wide 16 *R rosmarinifolium*

1 **R subsessile** Rendle in Journ Bot 34 (1896) 357 Merr in Govt Lab Publ (Philip) 29 (1905) 40

Luzon District of Lepanto Mount Data *Whitehead* in Herb Mus Brit (type) *Merrill 4606* Province of Benguet Suyoc to Pauai *Merrill 4690* Pauai *Bur Sci 4275 Mearns*, Mount Tonglon (Santo Tomas) *For Bur 5032 Curran Mearns s n , Merrill 4815, Williams 1223 2001, Elmer 5799, For Bur 11090 Whitford, For Bur 922 Barnes*

Widely distributed and very common in the highlands of northern Luzon from 1 800 to 2 250 m altitude apparently very closely allied to the Formosan *R oldhami* Maxim

2. **R. apoanum** Stein in Gartenflora 34 (1885) 194, *pl. 1196;* Vidal Rev. Pl. Vasc. Filip. (1886) 172; Merr. l. c. 43.

R. sp. affine *R. retuso* Benn., Vidal Sinopsis Atlas (1883) *t. 53, f. D.*

R. jasminiflorum F.-Vill. Nov. App. (1883) 353, non Hook.

MINDANAO, District of Davao, Mount Apo, *DeVore & Hoover 293, 375,* May, 1903; *Copeland 1045, 1440,* April and October, 1904; *Williams 2559,* March, 1905, altitude 2,500 to 3,100 m.

A species known only from Mount Apo, manifestly allied to *Rhododendron tubiflorum* DC., of Java, and less closely allied to *R. celebicum* Miq., of Celebes.

3. **R. xanthopetalum** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 41; Philip. Journ. Sci. 1 (1906) Suppl. 111.

LUZON, Province of Bataan, Mount Mariveles, *Whitford 332,* May, 1904; *For. Bur. 6279 Curran,* February, 1907, altitude 1,200 m. MINDORO, Ibalo River, *For. Bur 11429 Merritt,* May, 1908, altitude 800 m.

An epiphytic shrub with yellow flowers, apparently rare; allied to *Rhododendron teysmanni* Miq., of Java, Sumatra, and ? Celebes.

4 **R. nortonae** Merr. in Philip. Journ. Sci. 1 (1906) Suppl 220.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 500,* an epiphyte, altitude about 800 m, known only from this locality

5. **R. kochii** Stein in Gartenflora 34 (1885) 193, *t. 1195;* Vidal Rev. Pl. Vasc. Filip. (1886) 41; Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 41.

R. schadenbergii Merr. l. c., pro parte, non Warb.

R. javanicum Vid. Rev. Pl Vasc. Filip. (1886) 170; F.-Vill. Nov. App. (1883) 353, non Blume.

R. sp. (aff. *R javanicum*) Vidal Sinopsis Atlas (1883) *t. 60, f. F.*

LUZON, Province of Bataan, Mount Mariveles, *Merrill 3255; Whitford 450; Elmer 6856; For Bur. 790, 2117 Borden; Leiberg 6033; For. Bur. 6284 Curran; Bur. Sci. 1629 Foxworthy; Topping 806,* altitude 1,000 to 1,400 m: Province of Tayabas, Mount Banajao, *Whitford 958, For. Bur. 7868 Curran & Merritt,* altitude 1,800 to 2,250 m. MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4674 Mearns & Hutchinson,* May, 1906, altitude 1,800 m: District of Davao, Mount Apo, *DeVore & Hoover 73bis.*

Many of the above specimens were previously erroneously identified by me as *Rhododendron schadenbergii* Warb., from which they differ notably in the hirsute ovary. The shape of the leaves is variable, and but few of the specimens are as prominently acuminate as shown in the original figure, and they average smaller than the measurements given in the original description. The species is described as having five stamens, but the figure apparently shows ten, the latter number agreeing with our specimens.

6 **R. schadenbergii** Warb. in Perk. Frag. Fl. Philip. (1905) 172; Merr. l. c. 40, pro parte.

LUZON, Province of Abra, *Schadenberg* in Herb. Berol: Province of Benguet, Mount Santo Tomas, *Williams 990, 1348;* Baguio, *Elmer 6519.*

This species, as here interpreted, is closely allied to *R. kochii* Stein, differing notably in its glabrous ovaries. The type, which I have seen in the Berlin Herbarium, is in very poor condition, having been dried out from alcoholic material, and consequently much shriveled, so that an examination of it was very unsatisfactory: consequently my conception of the species has been based largely on the elaborate original description, with which the above specimens agree fairly well. Most of the specimens previously referred by me to this species are, I believe, referable to *Rhododendron kochii* Stein.

7. **R. spectabile** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 42.

MINDANAO, District of Davao, Mount Apo, *Copeland 1438; DeVore & Hoover 369*, in part, altitude about 2,500 m.

A species apparently allied to *Rhododendron javanicum* Blume, known only from this locality.

8. **R. clementis** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 160.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 732*, September-October, 1906, and three unnumbered sheets from the same locality, a species closely allied to *R. xanthopetalum*, but with larger flowers.

9. **R. vidalii** Rolfe in Journ. Bot. 24 (1886) 348; Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 43; Philip. Journ. Sci. 1 (1906) Suppl. 111.

R. verticillatum Vidal Rev. Pl. Vasc. Filip. (1886) 171; Ceron Cat. Pl. Herb. Manila (1892) 106, non Low.

R. lussoniense Rendle in Journ. Bot. 34 (1896) 356; Merr. l. c., 43.

LUZON, Province of Cagayan, Caua Volcano, *R. N. Clark s. n.*, altitude 930 m: Province of Bataan, Mount Mariveles, *Merrill 3743, 3868; For. Bur. 1591 Borden; Whitford 452*, altitude 1,000 to 1,200 m: Province of Tayabas, Mount Banajao, *Elmer 7475; Mount Malaraya, For. Bur. 7839 Curran & Merritt*, altitude 1,000 m.

A shrub, usually of small size and epiphytic, the flowers white. The type of the species was from the District of Bontoc, while the type of *R. lussoniense* Rendle, in Herb. Mus. Brit., is labeled Bagnen, Mount Polis, which is also in the same district. The species is somewhat variable in the form of its leaves.

10. **R. mindanaense** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 41.

MINDANAO, District of Davao, Mount Apo, *Copeland 1042; DeVore & Hoover 73*, altitude about 3,000 m.

A species known only from Mount Apo.

11. **R. copelandi** Merr. in Govt. Lab. Publ. 29 (Philip.) (1905) 42.

MINDANAO, District of Davao, Mount Apo, *Copeland 1034, 1439; DeVore & Hoover 292, 382; Williams 2681*, altitude 2,500 to 3,100 m.

Also known only from Mount Apo.

12. **R. currani** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 255.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8061 Curran & Merritt; Bur. Sci. 4988 Ramos*, December, 1907, altitude 2,000 m.

A species allied more closely to *R. whiteheadii* Rendle, than to *R. lussoniense* Rendle, but with longer and relatively narrower, quite differently shaped leaves. Additional material may prove the two species too closely allied to be kept separate.

13. **R. whiteheadii** Rendle in Journ. Bot. 34 (1896) 356; Merr. l. c. 43.

LUZON, District of Bontoc, Mount Polis, *Whitehead*, in Herb. Mus. Brit.

I have seen only the type of this species, which is from Mount Polis, according to the label.

14. **R. malindangense** Merr. in Philip. Journ. Sci. 3 (1908). Bot. 256.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4705 Mearns & Hutchinson*, May, 1906, altitude about 1,800 m.

In the original description of this species the leaves are erroneously described as oblong-ovate, which should be corrected to oblong-obovate.

15. **R. quadrasianum** Vidal Rev. Pl. Vasc. Filip. (1886) 170; Merr. Govt. Lab. Publ. (Philip.) 29 (1905) 43; Philip. Journ. Sci. 1 (1606) Suppl. 111; l. c. 2 (1907) Bot. 292.

R. retusum F.-Vill. Nov. App. (1883) 353, non R. Br.

LUZON, Province of Zambales, Mount Pinatubo, *Bur. Sci. 2537 Foxworthy*, alt. 1,600 to 1,800 m: Province of Bataan, Mount Mariveles, *Leiberg 6032; Elmer 6765; For. Bur. 2090 Borden; Whitford 278, 1104; Merrill 3215*, altitude 1,200 to 1,400 m: Province of Batangas, Mount Agas, *For. Bur. 7716 Curran & Merrit*, November, 1907, altitude 1,050 m: Province of Tayabas, Mount Banajao, *Cuming 804; For. Bur. 872 Klemme; For. Bur. 7888 Curran & Merritt*, altitude about 2,200 m: Province of Laguna, Mount Maquiling, *For. Bur. 7703 Curran & Merritt*, altitude 1,100 m: Province of Albay, Mount Mayon, *Bur. Sci. 6502 Robinson*, altitude 1,300 m. MINDORO, Mount Halcon, *Merrill 6158; For. Bur. 4408 Merritt*, latitude 1,350 to 1,600 m. NEGROS, Canlaon Volcano, *Banks*. MINDANAO, District of Davao, Mount Apo, *Williams 2543; Copeland 1036; DeVore & Hoover 287*, altitude 2,600 to 3,000 m.

Apparently the most common and widely distributed Philippine *Rhododendron*, found on most or all high mountains from north-central Luzon to south-eastern Mindanao.

Var. **intermedium** var. nov.

R. cuneifolium Rendle in Journ. Bot. 34 (1906) 355; Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 43, non Stapf.

A form intermediate between *R. quadrasianum* Vid., and *R. rosmarinifolium* Vid., with the leaf-form of the former, but with leaves almost as narrow as the latter, and might with almost equal propriety be considered a veriety of *R. rosmarinifolium*. From the leaf-form it appears to be dwarfed *R. quadrasianum*, and is accordingly considered under that species. It is the form credited to the Philippines by Rendle as *R. cuneifolium* Stapf, a Bornean species, and can be readily distinguished from Stapf's species by its pubescent pedicels.

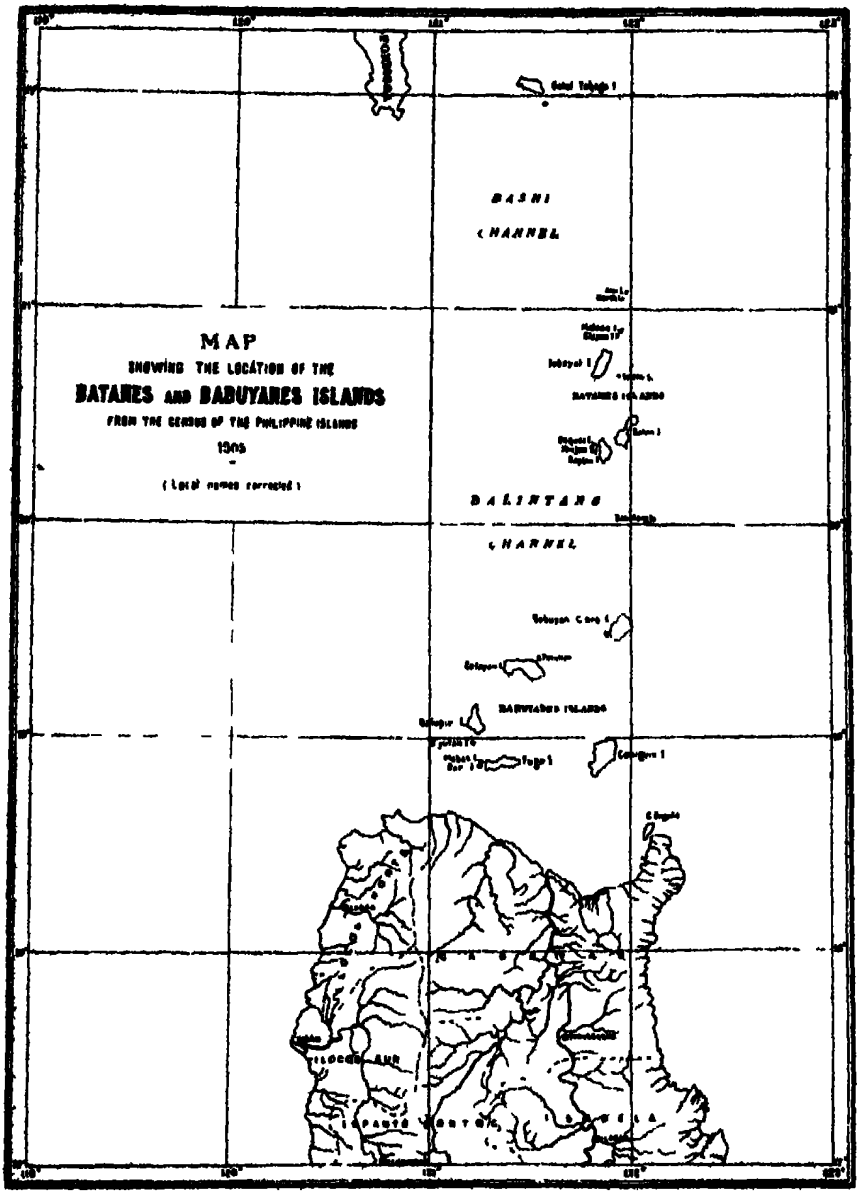
LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8063, 8036 Curran & Merritt; Bur. Sci. 5082a Ramos*, December, 1907, altitude about 2,100 m. MINDORO, Mount Halcon, *Merrill 5736; Whitehead* in Herb. Mus. Brit.

I have examined Whitehead's specimen, cited above, and consider it to be referable here, rather than to *R. cuneifolium* Stapf, although it is closely related to the Bornean species.

16. **R. rosmarinifolium** Vidal Rev. Pl. Vasc. Filip. (1886) 172; Merr. l. c. 43.

LUZON, Province of Benguet, Baguio, *Elmer 6377;* Mount Tonglon (Santo Tomas), *Elmer 5798; Williams 1335; For. Bur. 5035 Curran;* Suyoc to Panai, *Merrill 4752*, altitude 1,800 to 2,200 m.

The typical form of this species seems to be confined to the table-land of north-central Luzon and is very distinct, although manifestly allied to *R. quadrasianum* Vidal. On mountains farther south intermediate forms occur, as noted above.


MAP
SHOWING THE LOCATION OF THE
BATANES AND BABUYANES ISLANDS
FROM THE CENSUS OF THE PHILIPPINE ISLANDS
1903
(Local names corrected)
BASHI
CHANNEL
Itbayat I
BATANES ISLANDS
Batan I
BALINTANG
CHANNEL
Babuyan Claro I
Calayan I
BABUYANES ISLANDS
Fuga I
Camiguin I

ON A COLLECTION OF PLANTS FROM THE BATANES AND BABUYANES ISLANDS.

By Elmer D Merrill
(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

The Batanes, or Bashi, and the Babuyanes Islands form a group of small islands extending from near the north coast of Luzon to within about 160 kilometers of the southern point of Formosa. The Batanes are the most northern, consisting of 10 islands, of which the largest are Ibayat, Batan, and Sabtan, and the entire group is of volcanic formation, with the exception of the small islands of Desquey and Ibujos, and possibly Ibayat, nothing being known regarding the latter, Desquey and Ibujos being formed of coral limestone. Y'Ami Island, the most northern point of the Philippines, is about 270 kilometers north of Cape Engaño the nearest point of Luzon, 107 kilometers south of the Japanese Island of Little Botel Tobago, and 160 kilometers from the most southern point of Formosa. These islands are separated from Formosa by the Bashi Channel with a minimum depth of 1009 fathoms, while to the south the probably shallow channel of Balintang lies between them and the Babuyanes. It is said that on a clear day the Formosan mountains can be seen from the summit of Mount Iraya on Batan Island. The physiography of this group has been considered by Mr. Henry G. Ferguson of this Bureau, from whose paper the above information is taken.[1] Sabtan has an area of about 6 square miles, while Batan and Ibayat have each an area of about 27 square miles, the former two being mountainous, the highest peak being Mount Iraya on Batan Island, its altitude being about 1,140 m. Ibayat is comparatively low, its highest point being about 240 m. The islands are subject to the heavy monsoons, and typhoons are very prevalent, these constant and heavy winds no doubt having much influence on the vegetation. Batan is largely covered with grass-lands, forests for most part occurring only in the sheltered ravines. Ibayat is said to be the most fertile island of the group, but is considered to be unhealthy and is sparsely populated, its vegetation being partly forest and partly grass-lands.

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[1] *This Journal* 2 (1908) *Gen. Sci.* 1–24.

The Babuyanes group consists of about nine islands, the largest of which are Babuyan, Calayan, Dalupiri, Fuga, and Camiguin. Babuyan has an approximate area of 38 square miles, its highest altitude being about 960 m. Dalupiri is a low island for its greater part covered with grass-lands, its area being about 20 square miles. Fuga is also low, with an area of about 27 square miles, with few trees, and these mostly near the coast, the interior being covered by grass-lands. Calayan is slightly larger than Fuga, with a moderately high central range of hills, covered with heavy forest with occasional patches of cogon grass. Camiguin is the largest island of the two groups, its area being given as about 60 square miles, and is rather rough and densely forested, its two highest peaks being respectively about 827 and 735 m in altitude. Some of the information regarding Fuga and Calayan was taken from McGregor.[3] Areas of the different islands was taken from the Gazetteer of the Philippine Islands. The nomenclature of some of these islands is somewhat confusing, and care should be taken not to confound Camiguin Island of the Babuyanes group with Camiguin Island off the north coast of Mindanao, the latter being the Camiguin visited by the Challenger Expedition, while Batan Island of the Batanes group should not be confused with Batan Island off the east coast of Albay Province, southern Luzon, nor with Bataan Province of central Luzon.

In the following paper about 415 species are considered, but of the flowering plants collected, a few species of *Zingiberaceæ*, and about 10 species of *Orchidaceæ*, are not included, the material not being determined at this time. Considerable collections of fungi, lichens, mosses and scale-mosses were made, but no attempt has been made to include these.

The collection as a whole has shown the striking affinity of the flora of both groups to that of Luzon and the Philippines in general, and the comparatively slight relationship to that of Formosa. No less than 115 species, enumerated in the present paper, or about 28 per cent of the total, are at present known only from the Philippines, giving a high percentage of endemism, while representatives of the following list of 42 genera, all characteristic of the Philippine and Malay flora in general, are found in the two groups, but not as yet in Formósa, and representatives of but 10 of these have been found in southern China: *Casuarina, Pipturus, Leucosyke, Tinospora, Limacia, Anamirta, Talauma, Phaeanthus, Polyalthia, Myristica, Knema, Intsia, Wallaceodendron, Pterocarpus, Melicope, Lunasia, Micromelum, Chisochiton, Cyclostemon, Cleistanthus, Claoxylon, Homalanthus, Semecarpus, Turpinia, Gonocaryum, Ellatostachys, Pometia, Thespesia, Dillenia, Adenia, Medinilla, Boerlagiodendron, Aegiceras, Maba, Fagraea, Geniostoma, Cyrtandra, Trichosanthes, Argostemma, Sarcocephalus, Villaria,* and *Guettarda.*

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[3] Bull. Philip. Museum 4 (1904) 1–17.

A certain southward extension of the Formosan flora was to be expected, but this is exceedingly weak in comparison with the northward extension of the Philippine flora. But two genera are represented in the collection, previously unrecorded from the Philippines, *Erythraea*, represented by *E. spicata* (L.) Pers., an introduced species in Formosa, and *Phoenix*, represented by a new variety of *Phoenix hanceana* Naud., previously known from Formosa and southern China. Eight additional species only, not previously reported from the Philippines, *Ischaemum ciliare* Retz., *Lilium longiflorum* Thunb., *Elatostema platyphyllum* Forst., *Chenopodium acuminatum* Willd., *Pueraria thunbergiana* (S. & Z.) Benth., *Lysimachia mauritiana* Lam., *Clerodendron trichotomum* Thunb., and *Gynura elliptica* Yabe & Hayata, can be considered as having reached the two groups through Formosa. Of the above list but a single species, *Gynura elliptica* Yabe & Hayata, was previously known only from Formosa, while *Ischaemum ciliarē*, *Chenopodium acuminatum*, *Elatostema platyphyllum*, and *Lysimachia mauritiana* are species of wide distribution, and *Lilium longiflorum*, *Pueraria thunbergiana*, and *Clerodendron trichotomum* are Japanese types extending to southern China, Formosa, and the two last to Luzon.

My knowledge of the Formosan flora is based on the published works of Matsumura and Hayata,[3] and Hayata,[4] and on various supplementary papers published by the latter in the Tokyo Botanical Magazine; on a considerable number of Formosan plants in the Herbarium of this Bureau, received from Tokyo, and on the material in the Herbarium of the College of Science at Tokyo, which I had an opportunity of examining in June, 1907, in company with Dr. Hayata. The paucity of Philippine types in the Formosan collections at Tokyo is very striking, in comparison with the abundance of northern and continental types, and this character of the Formosan flora has been emphasized by Dr. Hayata in his latest publication. It seems evident, from information at present at hand, that the Formosan flora is not closely related to that of the Philippines, although due to the proximity of Luzon and Formosa, a certain number of species common and confined to Formosa and the Philippines are found. A list of these species is given below: *Bergia glandulosa* Blanco, *Illigera luzonensis* (Presl) Merr., *Rhamnus formosana* Matsum., *Uncaria florida* Vid., *Morinda parvifolia* Bartl., *Gynura elliptica* Yabe & Hayata, *Tabernaemontana cumingiana* A. DC., *Gaultheria cumingiana* Vidal, *Isanthera discolor* Maxim., *Callicarpa formosana* Rolfe, *Scutellaria luzonica* Rolfe, *Croton cumingii* Muell. Arg., *Villebrunea trinervis* Wedd., *Rubus rolfei* Vidal (var. *hirsutus* Hayata, in Formosa), *Ainsliaea reflexa* Merr., *Geodorum nutans* (Presl) Ames,

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[3] Enum. Pl. Formosa, *Journ. Coll. Sci. Tokyo* 22 (1906) 1-702.

[4] Flora Montana Formosae, l. c. 25^{19} (1908) 1-260.

Phalaenopsis aphrodite Reichb. f., *Dicksonia smithii* Hook., *Davallia cumingii* Hook., and *Polypodium meyenianum* Schott. This list of but 20 species is very small when compared with the list of over 50 known exclusively from Celebes and the Philippines,[6] the Celebes-Philippine list including two genera confined to the two groups, *Wallaceodendron*, monotypic, and *Reinwardtiodendron*, two species; moreover the flora of Formosa is infinitely better known than is that of Celebes. Three species, *Boea swinhoii* Hance, *Mallotus playfairii* Hemsl., and *Gaultheria borneensis* Stapf, have the peculiar distribution of from Formosa to Luzon and northern Borneo.

A certain number of species extend from Japan to southern China, Formosa and Luzon, and another group, Himalayan types, extends from the Himalayan region eastward to the mountains of Formosa and Luzon, and sometimes to Japan, but these can not be considered as throwing much light on the individual relationships of the floras of Luzon and Formosa, as, at least the Himalayan types, might have reached the two islands independently, and at entirely different periods.

The collections adds to our knowledge of the Philippine flora two genera, *Erythraea*, represented by the introduced *E. spicata* (L.) Pers., and *Phoenix*, represented by a new variety of *P. hanceana* Naud., and the following 12 species, previously described from extra-Philippine regions: *Ischaemum ciliare* Retz., *Setaria verticillata* (L.) Beauv., *Lilium longiflorum* Thunb., *Podocarpus polystachyus* R. Br., *Elatostema platyphyllum* Forst., *Chenopodium acuminatum* Willd., *Pueraria thunbergiana* (S. & Z.) Benth., *Lysimachia mauritiana* Lam., *Ipomoea stolonifera* (Cyrilli) Poir., *Clerodendron trichotomum* Thunb., and *Gynura elliptica* Yabe & Hayata, while 24 species have been described as new, 15 in the present paper, 9 in preceding ones.

The material on which the present paper was based, was collected, in part, in June, 1907, by Major E. A. Mearns, surgeon, United States Army, on the Islands of Batan and Fuga, but mostly by Mr. Eugenio Fénix of this Bureau, who in company with Mr. R. C. McGregor, also of this Bureau, spent the greater part of June and July on the islands of Batan, Sabtan, Babuyan, and Camiguin, a very few specimens being collected on Y'Ami Island. For the opportunity of having these collections made, this Bureau is indebted to Major-General Leonard Wood, and to the Honorable Dean C. Worcester, Secretary of the Interior of the Philippine Government.

The ferns enumerated below were identified by Dr. E. B. Copeland, of the Bureau of Education, Manila, and the palms by Dr. O. Beccari, Florence, Italy; all the other identifications, unless otherwise stated, were made by the author.

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[6] Merrill, *This Journal* 1 (1906) *Suppl.* 171.

HYMENOPHYLLACEÆ.

HYMENOPHYLLUM Smith.

H. dilatatum (Forst.) Sw.
BATAN, Santo Domingo de Basco, *3845 Féniæ*.
Widely distributed in the Philippines; Malaya to tropical Australia and Polynesia.

H. blumeanum Spreng.
BATAN, Santo Domingo de Basco, *3847 Féniæ*.
Rare in the Philippines; tropical Asia.

TRICHOMANES Linn.

T. javanicum Bl.
BATAN, Mount Iraya, *3793 Féniæ*.
Common in the Philippines; tropical Asia to Australia and Polynesia.

T. minutum Bl.
BATAN, Santo Domingo de Basco, *3846 Féniæ*.
Widely distributed in the Philippines; Malaya.

T. cupressoides Desv.
BATAN, Mount Iraya, *3832 Féniæ*.
Rather common in the Philippines; tropical Asia and Malaya.

T. sp.
BATAN, *3808*, *3843 Féniæ*.

CYATHEACEÆ.

ALSOPHILA R. Br.

A. glauca (Bl.) J. Sm.
BATAN, Santo Domingo de Basco, *3654 Féniæ*.
Tropical Asia and Malaya; widely distributed in the Philippines.

CYATHEA Sm.

C. fenicis Copel. supra 354.
BATAN, Santo Domingo de Basco, *3797 Féniæ*. N. v. *Garagad*.
Known only from this locality.

POLYPODIACEÆ.

DRYOPTERIS Adan.

D. adenophora C. Chr.
BATAN, Santo Domingo de Basco, *3796 Féniæ*. N. v., *Tubjá*.
Widely distributed in the Philippines; Celebes.

D. dissecta (Forst.) O. Ktz.
BATAN, Santo Domingo de Basco, *3655 Féniæ*.
Widely distributed in the Philippines; India to Madagascar, Malaya, Australia, and Polynesia.

D. gongylodes (Schkuhr) O. Ktz.
CAMIGUIN, *3962 Féniæ*.
Common in the Philippines; widely distributed in the tropics.

D. luzonica Christ.
BATAN, Santo Domingo de Basco, *3156 Mearns.*
Known only from the Philippines.

D. microloncha Christ.
BATAN, Santo Domingo de Basco, *3165 Fénix.*
Known only from the Philippines.

D. parasitica (L.) O. Ktz.
BATAN, Santo Domingo de Basco, *3780 Fénix.* N. v., *Apat.*
Widely distributed in the Philippines; tropical and subtropical regions of the World.

D. sparsa (Ham.) O. Ktz.
BATAN, Mount Iraya, *3829 Fénix.*
Widely distributed in the Philippines; India to China, Malaya and Mauritius.

D. setigera (Bl.) O. Ktz.
BATAN, Santo Domingo de Basco, *3138, 3149, 3162 Mearns; 3649 Fénix.*
Widely distributed in the Philippines; Japan to India, Malaya, Australia and Polynesia.

TECTARIA Cav.

T. crenata Cav.
BATAN, Santo Domingo de Basco, *3157, 3158, 3159, 3161, 3166 Mearns.*
Common and widely distributed in the Philippines; Malay Peninsula.

T. irregularis (Presl) Copel., var. **macrodon** Copel.
BABUYAN, *3915 Fénix.* CAMIGUIN, *4045, 4058 Fénix.*
Widely distributed in the Philippines; India to Malaya.

LEPTOCHILUS Kaulf.

L. heteroclitus (Presl) C. Chr.
BATAN, Mount Iraya, *3827 Fénix.* BABUYAN, *3918 Fénix.*
Widely distributed in the Philippines, Asia to Malaya and Polynesia.

NEPHROLEPIS Schott.

N. biserrata (Sw.) Schott.
BATAN, Santo Domingo de Basco, *3683, 3779 Fénix.*
Widely distributed in the Philippines; tropics generally.

N. hirsutula (Forst.) Presl.
BATAN, Santo Domingo de Basco, *3163 Mearns.*
Widely distributed in the Philippines; tropics generally.

DIPTERIS Reinw.

D. conjugata Reinw.
BATAN, Mount Iraya, *3819 Fénix.*
Throughout the Philippines at higher altitudes; tropical Asia to Malaya, and Polynesia.

DAVALLIA Smith.

D. solida (Forst.) Sw.
CAMIGUIN, *4140 Fénix.*
Widely distributed in the Philippines; Malaya, Polynesia and Queensland.

ODONTOSORIA (Presl) Fée.

O. chinensis (Linn.) J. Sm.
Batan, Santo Domingo de Basco, *3577*, *3686* *Fénix*.
Widely distributed in the Philippines; Japan to tropical Asia, Malaya, Polynesia and Madagascar.

LINDSAYA Dry.

L. repens (Bory) Bedd.
Batan, Mount Iraya, *3804* *Fénix*.
Widely distributed in the Philippines; tropical Asia, Polynesia, Malaya, and Mauritius.

L. davallioides Bl.
Batan, Mount Iraya, *3803* *Fénix*
Widely distributed in the Philippines; Malaya.

ATHYRIUM Roth.

A. japonicum (Thunb.) Copel.
Batan, Santo Domingo de Basco, *3812* *Fénix*. Babuyan, *3809* *Fénix*.
Northern Luzon, Japan to China and tropical Asia.

ASPLENIUM Linn.

A. nidus Linn.
Batan, Mount Iraya, *3791* *Fénix*. Babuyan, *3890* *Fénix*
Widely distributed in the Philippines; tropical Asia to Polynesia, Malaya, Australia, and eastern Africa

A. prionurus J. Sm.
Batan, Santo Domingo de Basco, *3793* *Fénix* Camiguin, *4137* *Fénix*
Endemic in the Philippines.

A. unilaterale Lam.
Babuyan, *3900* *Fénix*
Widely distributed in the Philippines; Japan to Polynesia, Malaya, tropical Asia and Africa.

WOODWARDIA Smith.

W. radicans (Linn.) Smith, var. **prolifera** W. & A.
Batan, Santo Domingo de Basco, *3773* *Fénix*.
The species in northern Luzon; Mediterranean region to southern China and Java, the variety otherwise not known from the Philippines.

ADIANTUM Linn.

A. caudatum Linn.
Batan, Santo Domingo de Basco, *3709* *Fénix*.
Very common in the Philippines; tropical Asia, Africa, Malaya, to New Hebrides.

A. capillus-veneris Linn., var.
Batan, Santo Domingo de Basco, *3152* *Mearns*.
A widely distributed species, known from the Philippines only from northern Luzon.

PTERIS Linn.

P. cretica Linn.
Batan, Santo Domingo de Basco, *3164* *Fénix*.
Widely distributed in the Philippines; tropical and subtropical regions of the World.

P. ensiformis Burm.

Batan, Santo Domingo de Basco, *3671 Fénix*.

Widely distributed in the Philippines; India to China, Malaya, Australia, and Polynesia.

P. quadriaurita Retz.

Batan, Santo Domingo de Basco, *3564, 3560 Fénix; 3148, 3150 Mearns*. Babuyan, *3913 Fénix*. Camiguin, *4029 Fénix*.

Widely distributed in the Philippines; tropical and subtropical regions of the World.

P. tripartita Sw.

Batan, Santo Domingo de Basco, *3698 Fénix*.

Widely distributed in the Philippines; tropical Asia, Africa, Malaya, Australia, and Polynesia.

HISTIOPTERIS J. Sm.

H. incisa (Thunb.) J. Sm.

Batan, Mount Iraya, *3824 Fénix*.

Widely distributed in the Philippines; tropical and subtropical regions of the World.

VITTARIA Smith.

V. elongata Sw.

Camiguin, *4143 Fénix*.

Widely distributed in the Philippines; tropical Asia to Malaya, Polynesia and Australia.

ANTROPHYUM Kaulf.

A. parvulum Bl.

Batan, Santo Domingo de Basco, *3788 Fénix*.

Widely distributed in the Philippines; Malaya.

POLYPODIUM Linn.

P. hirtellum Bl.

Batan, Mount Iraya, *3802, 3844 Fénix*.

Widely distributed in the Philippines at higher altitudes; central China to Malaya and New Caledonia.

P. palmatum Bl.

Batan, Mount Iraya, *3805 Fénix*.

Widely distributed in the Philippines at higher altitudes; Malaya.

P. phymatodes Linn.

Batan, Santo Domingo de Basco, *3563 Fénix; 3153, 3155 Mearns*.

Throughout the Philippines; tropical Asia, Africa, Malaya, Polynesia, and Australia.

P. punctatum (Linn.) Sw.

Camiguin, *4141 Fénix*. Sabtan, *3759 Fénix*.

Widely distributed in the Philippines at higher altitudes; tropical Asia and Africa to Malaya, Polynesia, and Australia.

CYCLOPHORUS Desv.

C. adnascens (Sw.) Desv.

Batan, Santo Domingo de Basco, *3631 Fénix*.

Throughout the Philippines; tropical Asia to Malaya and Polynesia.

C. acrostichoides (Forst.) Presl.

CAMIGUIN, *4088 Féniæ.*

Widely distributed in the Philippines, India to Malaya, Polynesia, and Queensland.

DRYNARIA J. Sm.

D. quercifolia (Linn.) J. Sm.

BATAN, Santo Domingo de Basco, *3168 Mearns.* CAMIGUIN, *4099 Féniæ.*

Throughout the Philippines; tropical Asia to Malaya, Polynesia, and the Fiji Islands.

SCHIZAEACEÆ.

LYGODIUM Sw.

L. japonicum (Thunb.) Sw.

BATAN, Santo Domingo de Basco, *3154a Mearns.*

Common in the Philippines; Japan to India, Malaya, and Australia.

L. circinatum (Burm.) Sw.

SABTAN, *3766 Féniæ.* CAMIGUIN, *3948 Féniæ.*

Very common in the Philippines, tropical Asia to Malaya and Queensland.

L. mearnsii Copel.

BATAN, Santo Domingo de Basco, *3136 Mearns* (type); *3651 Féniæ.* BABUYAN, *3916 Féniæ.*

Known only from the Batan and Babuyan Islands

MARATTIACEÆ.

ANGIOPTERIS Hoffm.

A. angustifolia Presl.

BABUYAN, *3897 Féniæ.*

Endemic in the Philippines.

MARATTIA Sw.

M. ternatea DeVr. & Hartig.

CAMIGUIN, *4150 Féniæ.*

Not uncommon in the Philippines; Moluccas.

OPHIOGLOSSACEÆ.

HELMINTHOSTACHYS Kaulf.

H. zeylanica (Linn.) Hook.

CAMIGUIN, *4095 Féniæ.*

Throughout the Philippines; tropical Asia to Australia and New Caledonia.

LYCOPODIACEÆ.

LYCOPODIUM Linn.

L. cernuum Linn.

BATAN, Mount Iraya, *3830 Féniæ.*

Throughout the Philippines; tropical and subtropical regions of the World.

L. squarrosum Forst.

CAMIGUIN, *4142 Féniæ.*

Widely distributed in the Philippines; India to Formosa, Malaya, Polynesia, and the Mascarene Islands.

L pinifolium Desv

Batan, Mount Iraya *3828 Fénix*.

Widely distributed in the Philippines; Malaya

SELAGINELLACEÆ

SELAGINELLA Spring

S spp

Three species are represented in the collection but I am not able to identify them satisfactorily at the present time Batan *3617 3667 Fénix* Camiguin *4076 Fénix*

CYCADACEÆ.

CYCAS Linn

C circinalis Linn

Camiguin *3977 Fénix*; *Worcester s n.*

Widely distributed in the Philippines India to Malaya and Polynesia

TAXACEÆ

PODOCARPUS L Hérit

P polystachyus R Br ex Mirb in Mém Mus 13 (1825) 75 Pilger in Pflanzenreich 18 (1903) 79

Batan Santo Domingo de Basco *3586 Fénix*

Not previously reported from the Philippines Singapore Sumatra and Java.

TYPHACEÆ

TYPHA Linn

T orientalis Presl

Camiguin *4061 Fénix*

Philippines Japan and northern China.

PANDANACEÆ

FREYCINETIA Gaudich

F scabripes Warb

Batan near the summit of Mount Iraya *3806 Fénix* N v *Uyod*

Known otherwise only from central Luzon

F williamsii Merr

Batan Mount Iraya, *3786 Fénix* N v *Vayasubas*

Known otherwise only from Luzon

PANDANUS Linn

P tectorius Soland

Sabtan *3731 3738 Fénix* Camiguin *4006 4103 Fénix* N V., *Ujango*

Along the seashore throughout the Philippines India to Malaya and Polynesia.

GRAMINEÆ

COIX Linn

C lachryma jobi Linn

Batan, Santo Domingo de Basco, *3809 Fénix* Camiguin, *3956 Fénix* N v *Agagay*

Throughout the Philippines warmer parts of the World

IMPERATA Cyr.

I. cylindrica, var. koenigii (Retz.) Benth.

Batan, Santo Domingo de Basco, *3678 Fénix; 3134 Mearns.* Camiguin, *4015 Fénix.* N. v., *Buchid.*

MISCANTHUS Anders.

M. japonicus (Thunb.) Anders.

Batan, Santo Domingo de Basco, *3689 Fénix.* Babuyan, *3917 Fénix.* N. v., *Viau.*

Not common in the Philippines; Japan to China and Malaya.

M. sinensis Anders.

Batan, Mount Iraya, *3818 Fénix.* N. v, *Viau.*

Common in the Philippines at medium and higher altitudes; Japan and China to Borneo and Celebes.

POGONATHERUM Beauv.

P. paniceum (Lam.) Hack.

Batan, Santo Domingo de Basco, *3636 Fénix.* Babuyan, *3901 Fénix*

Common throughout the Philippines; Japan to India and Malaya.

ROTTBOELLIA Linn f.

R. exaltata Linn. f.

Batan, Santo Domingo de Basco, *3815 Fénix.* N. v, *Annaray*

Widely distributed in the Philippines; tropics of the World.

MANISURIS Sw

M. granularis Linn f.

Batan, Santo Domingo de Basco, *3721 Fénix.*

Widely distributed in the Philippines; tropics of the World.

ISCHAEMUM Linn.

I. ciliare Retz. Obs. 6 (1791) 36; Hack. in DC. Monog. Phan. 6 (1889) 225

Batan, Santo Domingo de Basco, *3169 Mearns.*

India and Ceylon to China and Formosa; not previously found in the Philippines, although credited to the Archipelago by F. Villar, certainly on an erroneous identification.

I. muticum Linn.

Camiguin, *4021 Fénix.*

Along the seashore throughout the Philippines; British India to Formosa and Malaya.

APLUDA Linn.

A. mutica Linn.

Batan, Santo Domingo de Basco, *3638 Fénix.*

Common throughout the Philippines; India to China, Malaya, Australia and Polynesia.

ANDROPOGON Linn.

A. micranthus var. spicigerus (Benth.) Hack.

Camiguin, *4040 Fénix.* Babuyan, *3918 Fénix.* Sabtan, *3726 Fénix.*

Northern Luzon; China, Australia, and New Caledonia

A. halepensis var. propinquus (Kunth) Merr.

Batan, Santo Domingo de Basco, *3837 Fénix.* Camiguin, *4047 Fénix.*

Widely distributed in the Philippines; the variety extending from Ceylon to Amboina.

A. serratus Thunb., var. **nitidus** (Vahl) Hack.
Batan, Santo Domingo de Basco, *3704 Fénix.*
Widely distributed in the Philippines; India to Formosa and Malaya.

A. nardus Linn., var. **hamatulus** (Nees) Hack.
Sabtan, *Petrelli s. n.*
Not common in the Philippines, the variety extending to southern China and Formosa.

THEMEDA Forsk.

T. gigantea (Cav.) Hack.
Batan, Santo Domingo de Basco, *3632 Fénix.* Babuyan, *3922 Fénix.*
Widely distributed in the Philippines; some varieties in India, China and Malaya.

PASPALUM Linn.

P. scrobiculatum Linn.
Camiguin, *3969 Fénix.*
Common and widely distributed in the Philippines, tropical and subtropical regions of the World.

DIGITARIA Scop.

D. sanguinalis (Linn.) Scop.
Batan, Santo Domingo de Basco, *3681 Fénix.* N. v., *Dibubut*
Widely distributed in the Philippines; temperate and tropical regions of the World.

D. consanguinea Gaudich.
Camiguin, *4013, 4063 Fénix.* Batan, Santo Domingo de Basco, *3595 Fénix.* N. v., *Balumbis.*
Very common and widely distributed in the Philippines; Malaya and Polynesia.

D. violascens Link.
Batan, Santo Domingo de Basco, *3587 Fénix.*
Not common in the Philippines; tropical Asia, America and Malaya.

PANICUM Linn.

P. colonum Linn.
Camiguin, *4019 Fénix.*
Common throughout the Philippines; tropical and subtropical regions of the World

P. stagninum Retz.
Camiguin, *3937 Fénix.*
Common in the Philippines; tropical Asia and Malaya.

P. repens Linn.
Camiguin, *3975 Fénix.*
Common and widely distributed in the Philippines; tropical and subtropical regions of the World, especially near the seashore.

P. pilipes Nees.
Camiguin, *4012 Fénix.*
Common throughout the Philippines; India to Madagascar, Malaya, Australia and Polynesia.

P. patens Linn.
Batan, Santo Domingo de Basco, *3693 Fénix.* Camiguin, *3947 Fénix.*
Widely distributed in the Philippines; India to southern China, Malaya, and Polynesia.

OPLISMENUS Beauv.

O. compositus (Linn.) Beauv.
BATAN, Santo Domingo de Basco, *3692 Fénix*. N. v., *Balisibis*.
Widely distributed in the Philippines; tropics of both hemispheres.

SETARIA Beauv.

S. italica (Linn.) Beauv.
BATAN, Santo Domingo de Basco, *3170 Mearns; 3629 Fénix*. N. v., *Rautnocara*.
Cultivated in the Philippines, as in most tropical and temperate regions.

S. verticillata (Linn.) Beauv.
CAMIGUIN, *4041 Fénix*.
Near the seashore: not previously reported from the Philippines; temperate and tropical regions of the World.

SPINIFEX Linn.

S. squarrosus Linn.
CAMIGUIN, *3980 Fénix*.
Along the seashore throughout the Philippines; British India to southern China, Malaya, and Australia.

ELEUSINE Gaertn.

E. indica (Linn.) Gaertn.
BATAN, Santo Domingo de Basco, *3630 Fénix*.
Common in the Philippines; tropics of both hemispheres.

ERAGROSTIS Host.

E. tenella (Linn.) R. & S.
BATAN, Santo Domingo de Basco, *3635 Fénix*.
Common in the Philippines; tropical Asia, Africa, and Malaya.

CENTOTHECA Desv.

C. lappacea (Linn.) Desv.
BATAN, Santo Domingo de Basco, *3657 Fénix*. CAMIGUIN, *4054 Fénix*.
Common in the Philippines; tropical Asia, Africa, Malaya, Australia, and Polynesia.

SCHIZOSTACHYUM Nees.

S. acutiflorum Munro.
CAMIGUIN, *4031 Fénix*.
Widely distributed in the Philippines; endemic.

CYPERACEÆ.

KYLLINGA Rottb.

K. monocephala Rottb.
BATAN, Santo Domingo de Basco, *3684 Fénix*. CAMIGUIN, *3959 Fénix*.
Common in the Philippines; warm regions of the Old World, from eastern Asia to Polynesia.

PYCREUS Beauv.

P. polystachyus Beauv.
BATAN, Santo Domingo de Basco, *3174 Mearns; 3588 Fénix*.
Common in the Philippines; in all warm countries, especially near the sea.

CYPERUS Linn.

C. haspan Linn.
CAMIGUIN, *3953 Fénix*.
Common in the Philippines; all warm countries.

C. compressus Linn.
BATAN, Santo Domingo de Basco, *3684 Fénix*. N. v., *Captos*.
Common in the Philippines; warmer parts of both hemispheres.

C. distans Linn. f.
BATAN, Santo Domingo de Basco, *3676 Fénix*.
Common in the Philippines; in most warm countries.

C. radiatus Vahl.
CAMIGUIN, *3939 Fénix*.
Rather common in the Philippines; all warm countries.

MARISCUS Vahl.

M. cyperinus (Retz.) Vahl.
BATAN, Santo Domingo de Basco, *3675 Fénix*. CAMIGUIN, *3943 Fénix*. N. v., *Jané*.
Widely distributed in the Philippines; Ceylon to Polynesia.

M. stuppeus (Forst. f.) comb. nov.
Cyperus stuppeus Forst. f. Prodr. (1786) 89.
Mariscus albescens Gaudich. in Freycinet. Voy. (1826) 415.
Cyperus pennatus Lam. Ill. 1 (1791) 144.
BATAN, Santo Domingo de Basco, *3175 Fénix*.
Along the seashore throughout the Philippines; tropical Asia to Polynesia.

ELEOCHARIS R. Br.

E. afflata Steud.
CAMIGUIN, summit of the volcano, *4130 Fénix*.
High altitudes in northern Luzon; India to Japan.

FIMBRISTYLIS Vahl.

F. diphylla (Retz.) Vahl.
SABTAN, *3734 Fénix*.
Common in the Philippines; all warm and tropical countries.

F. miliacea Vahl.
CAMIGUIN, *3961 Fénix*.
Common in the Philippines; common from tropical Asia to Polynesia, in tropical Africa and America scattered.

F. spathacea Roth.
BATAN, Santo Domingo de Basco, *3575 Fénix*; *3171*, *3172*, *3178 Mearns*. CAMIGUIN, *4042 Fénix*. BABUYAN, *3926 Fénix*.
Not common in the Philippines; tropical Asia, America, and the Mascarene Islands.

BULBOSTYLIS Kunth.

B. barbata (Rottb.) Kunth.
BATAN, Santo Domingo de Basco, *3711 Fénix*. N. v., *Jumót*.
Widely distributed in the Philippines; warmer parts of the Old World.

CLADIUM R. Br.

C. latifolium Merr.

BATAN, summit of Mount Iraya, *3822 Fénix*.

A species known only from the higher mountains of the northern Philippines.

SCLERIA Berg.

S. scrobiculata Nees.

CAMIGUIN, *3950 Fénix*. SABTAN, *3747 Fénix*.

Widely distributed in the Philippines; Andaman Islands to Riu Kiu and New Guinea.

CAREX Linn

C. cruciata Wahl.

BATAN, Mount Iraya, *3801 Fénix*.

Not previously reported from the Philippines, but common on the higher mountains of northern Luzon, India to China and Madagascar.

PALMÆ.

DAEMONOROPS Bl.

D. gaudichaudii Mart.

CAMIGUIN, *4066 Fénix*

A widely distributed species in the Philippines; endemic.

CALAMUS Linn

C. mollis Blanco

CAMIGUIN, *4032 Fénix*.

Widely distributed in the Philippines; endemic

C. siphonospathus Mart., var **batanensis** Becc supra 342.

BATAN, in thickets near Mount Iraya, *3611 Fénix*. N. v., *Valit*.

C. mitis Becc. supra 341.

CAMIGUIN, *4075 Fénix*. BATAN, Santo Domingo de Basco, *3817 Fénix*, from a cultivated specimen, the fruit white, edible N v, *Tebdas*.

PINANGA Bl.

P. barnesii Becc.

CAMIGUIN, *4144 Fénix*.

Luzon and Mindoro at medium altitudes.

P. elmerii Becc.

CAMIGUIN, *4149 Fénix*.

Common in the Philippines at medium and higher altitudes; endemic.

P. urosperma Becc. supra 341.

CAMIGUIN, in forests, *4044 Fénix*.

P. batanensis Becc. supra 340.

BATAN, along mountain streams, *3841 Fénix*.

ARECA Linn.

A. catechu Linn.

BATAN, Santo Domingo de Basco, *3834 Fénix*. N. v., *Dapiau*.

Cultivated throughout the Philippines; India, Malaya, etc.

PHOENIX Linn.

P. hanceana Naud., var. **philippinensis** Becc. supra 339.

SABTAN, *3744 Fénix*. N. v., *Vovavoy*.

The first representative of the genus to be found in the Philippines, the leaves being used extensively by the inhabitants of Sabtan and neighboring islands for making the characteristic rain-coats known as Suót. The species in southern China.

ARACEÆ.

AGLAONEMA Schott

A. haenkei Schott.

CAMIGUIN, *4089 Fénix*

Philippines and Celebes.

FLAGELLARIACEÆ.

FLAGELLARIA Linn.

F. indica Linn.

CAMIGUIN, *4094 Fénix*. SABTAN, *3758 Fénix* N v., *Auay*

Widely distributed in the Philippines; India to Formosa, Malaya, Polynesia, and Australia.

COMMELINACEÆ.

COMMELINA Linn.

C. benghalensis Linn.

BATAN, Santo Domingo de Basco, *3590 Fénix; 3230 Mearns*

Widely distributed in the Philippines; widely distributed in the tropics of the Old World.

C. nudiflora Linn.

CAMIGUIN, *3938 Fénix*. SABTAN, *3728 Fénix*. N. v, *Cajasi*.

Widely distributed in the Philippines; tropics of the World.

POLLIA Thunb.

P. sorzogonensis (E Meyer) Endl.

BABUYAN, *3891 Fénix*. BATAN, Santo Domingo de Basco, *3697 Fénix, 3211 Mearns*. CAMIGUIN, *4058 Fénix*.

Widely distributed in the Philippines; India to Formosa and Malaya.

LILIACEÆ.

LILIUM Linn.

L. longiflorum Thunb. Trans. Linn. Soc 2 (1794) 333; Baker in Journ Linn. Soc. Bot. 14 (1875) 229.

Y'AMI, *Worcester s. n.* BATAN, Santo Domingo de Basco, *3774 Fénix*. N. v., *Vonitan*.

Not previously found in the Philippines, the second species of the genus for the Archipelago; Japan to southern China and Formosa.

DRACAENA Vand.

D. angustifolia (Rumph.) Roxb.

BATAN, Santo Domingo de Basco, *3661, 3842 Fénix*.

Common and widely distributed in the Philippines; India to Malaya, and Australia.

DIANELLA Lam

D. ensifolia (Linn.) Red.

BATAN, Santo Domingo de Basco, *3142 Mearns.*

Widely distributed in the Philippines at higher altitudes; Mascarene Islands, tropical Asia to Formosa and the Riu Kiu Islands, Malaya, Australia, to Polynesia and the Hawaiian Islands.

AMARYLLIDACEÆ.

CURCULIGO Gaertn.

C. recurvata Dryand.

BATAN, Santo Domingo de Basco, *3826 Fénix.*

Widely distributed in the Philippines; India to Formosa, Malaya, and Australia.

DIOSCOREACEÆ.

DIOSCOREA Linn.

D. pentaphylla Linn.

BATAN, Santo Domingo de Basco, *3659 Fénix.*

Widely distributed in the Philippines; tropical Africa to Asia, and Malaya.

CASUARINACEÆ.

CASUARINA Forst.

C. equisetifolia Forst.

CAMIGUIN, *4121 Fénix.*

Widely distributed in the Philippines; southern Asia to Malaya, Australia and Polynesia, but not reported from southern China or Formosa.

PIPERACEÆ.

PIPER Linn.

P. spp.

Two species are represented in the collection, BATAN, *3652 Fénix;* CAMIGUIN, *4092 Fénix.* I have not been able to specifically identify either with satisfaction.

ULMACEÆ.

TREMA Lour.

T. amboinensis Blume.

BATAN, Santo Domingo de Basco, *3813 Fénix.* N. v., *Anariong.*

Abundant and widely distributed in the Philippines; British India to Formosa, Malaya, and Polynesia.

MORACEÆ.

ARTOCARPUS Forst.

A. rubrovenia Warb.

BATAN, Santo Domingo de Basco, *3581, 3814 Fénix.* N. v., *Mulni.*

Not uncommon in the Philippines; endemic.

A. communis Forst.

CAMIGUIN, *4069 Fénix.* BATAN, Santo Domingo de Basco, *3613 Fénix.* N. v., *Tipujó.*

Forms of the widely distributed bread-fruit, with entire or nearly entire leaves, the fruit edible. Malaya and Polynesia, cultivated and wild, exceedingly variable.

FICUS Linn.

F. ampelas Burm.

Sabtan, *3754 Fénix*

Rather common in the Philippines India to Malaya

F caudatifolia Warb.

Camiguin *4131 4107 Fénix* Batan Santo Domingo de Basco, *3781 Fénix* N v *Alintabao*

An endemic form closely allied to *F rostrata* Lam and frequently so identified

F stipulosa Miq Ann Mus Lugd Bat 3 (1867) 287 King in Ann Bot. Gard Calcutta 1^{2} (1887) 284

Urostigma stipulosum Miq in Lond Journ Bot. 6 (1847) 568

Urostigma caulocarpum Miq l c non *Ficus caulocarpa* Miq Ann Mus Lugd. Bat 3 (1867) 235

Ficus infectoria Roxb var *caulocarpa* (Miq) King, l c 63

Batan Santo Domingo de Basco *3706 Fénix*

Common and widely distributed in the Philippines Borneo

The synonymy of this species is rather complicated as Miquel in 1867 described *Ficus caulocarpa* without any reference to his earlier *Urostigma caulocarpum* the latter being based on a Philippine specimen, *Cuming no 1930* and the former on Celebes material As the specific name *caulocarpa* is thus invalidated in *Ficus* for the present form another name becomes necessary and I have here adopted *Ficus stipulosa* Miq to designate the Philippine form King l c 184 expresses the opinion that *F stipulosa* Miq is identical with *Urostigma caulocarpum* Miq and after examining the various numbers of Cuming's Philippine plants I am of the same opinion *F stipulosa* Miq, is certainly only immature *Urostigma caulocarpum* with the stipules not fallen The form is exactly matched by some of our recently collected material

F megacarpa Merr in Govt Lab Publ (Philip) 17 (1904) 14.

F ellipticа Miq in Lond Journ Bot 7 (1848) 440 non H B K.

Camiguin *4104 Fénix*

A species known only from the Philippines

Ficus elliptica Miq was described from a sterile specimen Philippines *Cuming 1927* and was later reduced by Miquel himself to *F disticha* Blume in which he was followed by King I have examined Cuming's specimen and am of the opinion that it is identical with the species which I described as *F megacarpa* which is not at all allied to *F disticha* Blume Miquel's name is however invalidated by the earlier *F elliptica* H B K

F haulii Blanco

Camiguin *3995 Fénix* Batan Santo Domingo de Basco *3567 Fénix* N v *Yabnay*

This species is scarcely distinct from *Ficus leucantatoma* Poir, and is the Philippine form so identified by many authors It has recently been described by Warburg as *Ficus didymophylla*, but Blanco's name is much the older and should be maintained if the plant is to be retained as distinct from *F. leucantatoma* Poir Endemic in the Philippines

Ficus *mearnsii* sp nov § *Eusyce*

Frutex repens, ramis teretibus glabris, ramulis junioribus brunneis, plus minus ferrugineo-hirsutis; foliis subcoriaceis, suborbicularibus vel ellipticis, glabris, 5 ad 12 cm longis, apice rotundatis, basi late rotundatis, subpeltatis, nervis utrinque circiter 6, prominentibus, distantibus, anastomosantibus; receptaculis axillaribus, solitariis vel binis, pedunculatis, subglobosis, rubris, glabris, 1 ad 1.3 cm diametro, basi 3-bracteolatis; pedunculis 1 ad 2 cm longis, pubescentibus.

A prostrate shrub spreading over the ground and rocks. Branches terete, glabrous, reddish-gray, the branchlets rather thick, reddish-brown, somewhat ferruginous-hirsute. Leaves suborbicular to elliptical, 5 to 12 cm long, 4.5 to 8 cm wide, subcoriaceous, brownish when dry, entire, smooth, slightly shining above, base and apex broadly rounded, the former, in young leaves, slightly subpeltate and very obscurely cordate, glabrous, or with very few hairs along the midrib beneath; nerves about 6 on each side of the midrib, prominent, distant, spreading, anastomosing into an arched marginal nerve, the reticulations rather close, distinct; petioles 0.5 to 2 cm long, ferruginous-pubescent. Receptacles axillary, solitary or in pairs, male and gall flowers in one set, fertile female flowers only in other sets, subglobose, glabrous, dark-red when mature, 1 to 1.3 cm in diameter, the peduncles 1 to 2 cm long, pubescent, the apex, just below the receptacle, with three small bracts. Staminate flowers pedicelled, the perianth segments 4, dark-purplish, 1 mm long, the pedicel with a single bracteole similar to the perianth segments; stamens usually 2, rarely 3, or even 4, the anthers 1.2 mm long. Gall flowers in the same receptacle, the perianth and bracteole as in the male flowers, the ovary ovoid, 1.2 mm long. Fertile female flowers in separate receptacles, the perianth small, the ovary ovoid, 1.5 mm in diameter, the interior wall of the receptacle with numerous triangular-ovate, dark-purple scales.

BATAN, Santo Domingo de Basco, *3573 Fénix* (type), *3232 Mearns*. BABUYAN, *3895 Fénix*. N. v., *Tapá*.

A species well characterized by its smooth elliptical or suborbicular leaves, distant nerves and pedicelled receptacles.

F. nota (Blanco) Merr.

CAMIGUIN, *4014 Fénix*.

One of the most common and widely distributed species of the genus in the Philippines; endemic.

F. philippinensis Miq.

BATAN, Santo Domingo de Basco, *3605, 3783 Fénix; 3783 Mearns*. N. v., *Nusú*.

A widely distributed endemic species of doubtful status.

The validity of this species is doubtful, King reducing it to *F. decaisneana* Miq., while Hemsley is of the opinion that it is identical with *F. gibbosa* Bl. (*F. insularis* Miq.) Elmer has recently described it again as *F. confusa*.

F. ulmifolia Lam. Encycl. 2 (1790) 499.

F. sinuosa Miq. in Lond. Journ. Bot. 7 (1848) 232.

CAMIGUIN, *4010 Fénix*. BABUYAN, *3919 Fénix*. BATAN, Santo Domingo de Basco, *3579 Fénix*. N. v., *Yaysi*.

The earliest description of this form is that of Lamarck, *F. ulmifolia* Lam. being based on Philippine material. The species was considered as a doubtful one by Miquel. *F. sinuosa* Miq., based on *Cuming 1921*, and var. *integrifolia* Miq., based on *Cuming 1924*, both from the Philippines, are manifestly one species, and

I am of the opinion that it is identical with Lamarck's. *F. sinuosa* Miq. has been reduced by King to *F. quercifolia* Roxb., with the description of which it does not well accord. *Ficus difformis* Lam. l.c. 500, also described from Philippine material, and also considered by Miquel as a doubtful species, is apparently the same as *F. ulmifolia* Lam. The species is exceedingly variable.

CONOCEPHALUS Blume.

C. grandifolius Warb.

BABUYAN, *3928 Fénix*. CAMIGUIN, *4148 Fénix*.

Previously known only from Luzon.

MORUS Linn.

M. alba Linn.

BATAN, Santo Domingo de Basco (cultivated), *3687 Fénix*. N. v., *Tangud*.

The mulberry, occasionally found in cultivation in the Philippines; cultivated in temperate and tropical regions generally.

URTICACEÆ.

LAPORTEA Gaudich.

L. mindanaensis Warb.?

BATAN, Santo Domingo de Basco, *3719 Fénix*. N. v., *Jateng*.

The identification is doubtful, specimens in fruit; an endemic species.

ELATOSTEMA Forst.

E. platyphyllum Wedd.

BATAN, Santo Domingo de Basco, *3608 Fénix*. N. v., *Reyrey*. The succulent stems are cooked as a pot-herb.

Not previously reported from the Philippines; Himalayan region to southern China and Formosa.

BOEHMERIA Jacq.

B. blumei Wedd.

BATAN, Santo Domingo de Basco, *3574 Fénix; 3227 Mearns*. N. v., *Tangao*.

Known only from the Philippines.

B. nivea Gaudich.

BATAN, Santo Domingo de Basco, *3204 Mearns*.

India to Japan and Malaya; occasionally found in cultivation in the Philippines, but certainly introduced. Ramie.

POUZOLZIA Gaudich.

P. indica (Linn.) Gaudich.

BATAN, Santo Domingo de Basco, *3695 Fénix*. CAMIGUIN, *3955 Fénix*.

Widely distributed in the Philippines; tropical Asia to Formosa, Malaya and Polynesia.

PIPTURUS Wedd.

P. asper Wedd.

CAMIGUIN, *3993 Fénix*.

Common and widely distributed in the Philippines; endemic.

VILLEBRUNEA Gaudich.

V. trinervia Wedd.

BABUYAN, *3910 Fénix*.

Widely distributed in the Philippines; Formosa.

LEUCOSYKE Zoll. & Mor.

L. capitellata (Poir.) Wedd.

SABTAN, *3752 Fénix*. BATAN, Santo Domingo de Basco, *3653 Fénix*. CAMIGUIN, *4134 Fénix*. N. v., *Bujuan*.

Widely distributed in the Philippines; Malaya.

LORANTHACEÆ.

LORANTHUS Linn.

L. spicifer (Presl) F.-Vill.

CAMIGUIN, *4111 Fénix*.

Widely distributed in the Philippines; endemic.

POLYGONACEÆ.

POLYGONUM Linn.

P. chinense Linn.

BATAN, Santo Domingo de Basco, *3673 Fénix; 3223 Mearns*. N. v., *Uonó*.

Widely distributed in the Philippines at medium altitudes; India to Japan, Formosa, and Malaya.

CHENOPODIACEÆ.

CHENOPODIUM Linn.

C. acuminatum Willd.

BATAN, Santo Domingo de Basco, *3807 Fénix*.

Not previously reported from the Philippines; Siberia to China, Japan, and Formosa.

AMARANTACEÆ.

AMARANTUS Linn.

A. viridis Linn.

CAMIGUIN, *3973 Fénix*.

Common and widely distributed in the Philippines; tropics generally.

DEERINGIA R. Br.

D. indica Zoll. & Mor.

CAMIGUIN, *4078 Fénix*. BATAN, Santo Domingo de Basco, *3222 Mearns; 3664 Fénix*. FUGA, *3239 Mearns*.

Common and widely distributed in the Philippines; Malaya to New Guinea.

NYCTAGINACEÆ.

BOERHAAVIA Linn.

B. diffusa Linn.

CAMIGUIN, *4035 Fénix*.

Common and widely distributed in the Philippines; tropics generally.

AIZOACEÆ.

MOLLUGO Linn.

M. spergula Linn.

CAMIGUIN, *4037 Fénix*.

Widely distributed in the Philippines; tropical Asia, Africa, Malaya, and Australia.

PORTULACACEÆ.

PORTULACA. Linn.

P. oleracea Linn.

BATAN, Santo Domingo de Basco, *3666 Féniæ.*

Common throughout the Philippines; temperate and tropical regions of the World.

P. quadrifida Linn.

SABTAN, *3750 Féniæ.*

Not common in the Philippines; tropical Asia and Africa.

MENISPERMACEÆ.

TINOSPORA Miers.

T. reticulata Miers.

BATAN, *3614 Féniæ.* N. v., *Camibiac.*

Widely distributed in the Philippines; endemic.

STEPHANIA Lour.

S. japonica Miers.

BATAN, *3672 Féniæ; 3229 Mearns;* (det. Diels). N. v., *Cureng.*

Japan.

LIMACIA Lour.

L. cuspidata (Wall.) Hook. f. & Th.

CAMIGUIN, *4034 Féniæ.*

Widely distributed in the Philippines; India to southern China and Malaya.

ARCANGELISIA Becc.

A. lemniscata (Miers) Becc. Malesia 1 (1877) 147.

CAMIGUIN, *3981 Féniæ;* (det. Diels).

Widely distributed in the Philippines but not previously reported from the Archipelago; Borneo and Celebes.

MAGNOLIACEÆ.

TALAUMA Juss.

T. luzonensis Warb.

CAMIGUIN, *4070 Féniæ.*

Previously known only from northern Luzon.

ANONACEÆ.

PHAEANTHUS Hook. f.

P. ebracteolatus (Presl) Merr.

CAMIGUIN, *4057 Féniæ.*

Common and widely distributed in the Philippines; endemic.

POLYALTHIA Blume.

P. clusiflora (Merr.) C. B. Robinson.

BABUYAN, *3921 Féniæ.*

Common and widely distributed in the Philippines; endemic.

MYRISTICACEÆ.

MYRISTICA Linn.

M. guatteriifolia A. DC.

CAMIGUIN, *4105 Fénix.*

Common and widely distributed in the Philippines; Labuan.

KNEMA Lour.

K. heterophylla (F.-Vill.) Warb.

CAMIGUIN, *4049 Fénix.*

Common and widely distributed in the Philippines; endemic.

LAURACEÆ.

LITSEA Lam.

L. sp.

BATAN, Santo Domingo de Basco, *3585, 3717 Fénix.* FUGA, *3244 Mearns.* N. v., *Tubjus.*

One specimen is with mature fruit, and the other two with unopened flowers; possibly *Actinodaphne.*

CASSYTHA Linn.

C. filiformis Linn.

SABTAN, *3730 Fénix.* CAMIGUIN, *4009 Fénix.* N. v., *Uauaquen.*

Common along the seashore throughout the Philippines; tropics generally.

HERNANDIACEÆ.

ILLIGERA Blume.

I. luzonensis (Presl) Merr.

CAMIGUIN, *4083 Fénix.* A single specimen with larger fruits than the typical form, and possibly a distinct species.

Philippines and Formosa.

PAPAVERACEÆ.

ARGEMONE Linn.

A. mexicana Linn.

BATAN, Santo Domingo de Basco, *3224 Mearns.*

A weed of American origin, now common throughout the Philippines, and the tropics generally.

CAPPARIDACEÆ.

POLANISIA Raf.

P. viscosa (Linn.) DC.

BATAN, Santo Domingo de Basco, *3560 Fénix.* N. v., *Cabáo.*

Widely distributed in the Philippines; tropics generally.

SAXIFRAGACEÆ.

HYDRANGEA Linn.

Hydrangea subintegra sp. nov.

Arbuscula circiter 1.5 m alta, inflorescentiis exceptis glabra; ramis ramulisque teretibus, rubro-brunneis; foliis oblongo-lanceolatis, membranaceis, acuminatis, 8 ad 11 cm longis, supra brunneis, subtus pallidioribus, integris vel obscure distanter denticulatis; cymis terminalibus 5 ad 7 cm longis, sparse fulvo-hirsutis; floribus exterioribus sterilibus, sepalis 4 petaloideis, obovoideis vel elliptico-obovoideis, 1 ad 1.3 cm longis, glabris; floribus interioribus 5-meris.

A shrub about 1.5 m high, erect, glabrous except the inflorescence, the branches terete, reddish-brown, smooth and somewhat shining. Leaves opposite, oblong-lanceolate, membranaceous, 8 to 11 cm long, 1.5 to 3 cm wide, the upper surface brownish when dry, the lower surface paler, somewhat shining, the margins entire, sometimes distantly and obscurely denticulate, the apex rather strongly acuminate, the base acute; primary nerves about 5 on each side of the midrib, distant, irregular, anastomosing, the secondary ones nearly as prominent, the reticulations lax; petioles 1 to 1.5 cm long. Cymes terminal, 5 to 7 cm long, slightly fulvous-hirsute. Outer flowers sterile, their 4 sepals petaloid obovoid to elliptical-obovoid, 1 to 1.3 cm long, glabrous, white, rounded at the apex, one usually larger than the other three; petals oblong or narrowly oblong-obovate, obtuse or retuse, 2 to 2.5 mm long: stamens 8; ovary rudimentary. Inner flowers pedicellate, pedicels 3 mm long: calyx teeth 5, oblong, 1 mm long; petals 5, narrowly obovate-oblong, obtuse or retuse, about 2.5 mm long, 1 mm wide; stamens 10; filaments 1.5 to 2 mm long; styles 3. Capsule narrowly ovoid, glabrous, 3 to 4 mm long.

BATAN, Santo Domingo de Basco, *Bur. Sci. 3776 Féniæ*, June, 1907. N. v., *Gagadang*.

Readily distinguished from the Philippine *Hydrangea lobbii* Maxim., by its entire or nearly entire, elongated leaves, which are not barbate in the axils beneath. It seems to be most closely allied to the Formosan *H. integra* Hayata, but has smaller leaves, four petaloid sepals to the outer flowers instead of two, and is apparently an erect shrub, not scandent.

PITTOSPORACEÆ.

PITTOSPORUM Banks.

P. odoratum Merr.

SABTAN, *3764 Féniæ*.

Widely distributed in the central and northern Philippines at medium and higher altitudes; endemic.

LEGUMINOSÆ.

PITHECOLOBIUM Mart.

P. montanum Benth.

SABTAN, *3740 Féniæ*.

Rather widely distributed in the Philippines; British India and Malaya.

WALLACEODENDRON Koorders.

W. celebicum Koorders.

CAMIGUIN, *4098 Fénix*, near the seashore.

A monotypic genus known only from Celebes and the Philippines, in the latter group not uncommon in some parts of Luzon. I am unable to distinguish from it the recently described *Pithecolobium williamsii* Elmer, from Luzon.

ACACIA Willd.

A. pennata Willd.

CAMIGUIN, *4038 Fénix*.

Rare in Luzon; British India to tropical Africa, Malaya, Southern China and ? Formosa.

INTSIA Thouars.

I. bijuga (Colebr.) O. Ktz.

CAMIGUIN, *4036 Fénix*.

Along the seashore throughout the Philippines; widely distributed in Malaya and Polynesia but not known from southern China or Formosa.

CASSIA Linn.

C. tora Linn.

BATAN, Santo Domingo de Basco, *3641 Fénix*.

A common weed in the Philippines; cosmopolitan in the tropics.

CAESALPINIA Linn.

C. pulcherrima Sw.

CAMIGUIN, *4077 Fénix*.

Common in cultivation in the Philippines, a native of tropical America.

SOPHORA Linn.

S. tomentosa Linn.

SABTAN, *3737 Fénix*. N. v., *Cápon*.

Along the seashore throughout the Philippines; cosmopolitan in the tropics.

CROTALARIA Linn.

C. incana Linn.

CAMIGUIN, *4085 Fénix*.

Widely distributed in the Philippines; tropical Asia, Africa, Malaya, and America, but not reported from southern China or Formosa.

DESMODIUM Desv.

D. umbellatum (Linn.) DC.

SABTAN, *3745 Fénix*. CAMIGUIN, *4115 Fénix*.

Near the seashore throughout the Philippines; tropical Asia to Formosa, Malaya, and Polynesia.

D. scorpiurus (Sw.) Desf.

BATAN, Santo Domingo de Basco, *3699 Fénix*.

A species of American origin, now common and widely distributed in the Philippines, but not as yet reported from any other part of the east.

D. leptopus A. Gray.

CAMIGUIN, summit of the volcano, *4132 Fénix*.

A widely distributed endemic species, allied to if not identical with *Desmodium gardneri* Benth., the latter species having been credited to southern China and Formosa by Forbes & Hemsley, based on young specimens which were doubtfully referred to it.

ALYSICARPUS Neck.

A. vaginalis (Linn.) DC.

SABTAN, *3735 Féniæ*.

Widely distributed in the Philippines; tropical Asia, Africa, and Malaya, introduced into America.

DALBERGIA Linn. f.

D. ferruginea Roxb.

SABTAN, *3739 Féniæ*.

Widely distributed in the Philippines; Malaya, but not known from Formosa or southern China.

DERRIS Lour.

D. uliginosa (Wall.) Benth.

CAMIGUIN, *4001 Féniæ*.

Common along the seashore throughout the Philippines; tropical Asia to Formosa, Africa, Malaya, and Australia.

ABRUS Linn.

A. precatorius Linn.

SABTAN, *3729 Féniæ*. CAMIGUIN, *4028 Féniæ*. N. v., *Lasa*.

Common and widely distributed in the Philippines; cosmopolitan in the tropics of the World.

PTEROCARPUS Linn.

P. indicus Willd.

CAMIGUIN, *3976 Féniæ*.

Widely distributed in the Philippines, an important timber tree; tropical Asia to southern China and Malaya, but not known from Formosa.

PUERARIA DC.

P. thunbergiana (Sieb. & Zucc.) Benth.

BATAN, Santo Domingo de Basco, *3833 Féniæ*. CAMIGUIN, *4116 Féniæ*.

Japan to Formosa and southern China; not previously reported from the Philippines, but also represented in our herbarium by specimens from Luzon.

CANAVALIA Adans.

C. turgida Grah.

CAMIGUIN, *4071 Féniæ*. BATAN, Santo Domingo de Basco, *3189 Mearns*.

Along the seashore throughout the Philippines; tropical Asia and Malaya. A form frequently identified as *C. obtusifolia* DC.

C. lineata (Thunb.) DC.

BATAN, Santo Domingo de Basco, *3680 Féniæ*.

Common along the seashore in the Philippines; widely distributed.

INDIGOFERA Linn.

I. anil Linn.

BATAN, Santo Domingo de Basco, *3596 Féniæ*. CAMIGUIN, *3965 Féniæ*. N. v., *Pauay*.

Common in the Philippines; supposed to be a native of tropical America, but now widely distributed, wild and cultivated, in the tropics of the World.

I. tinctoria Linn.

BATAN, Santo Domingo de Basco, *3705 Féniæ*. N. v., *Tayum*.

Commoner than the preceding in the Philippines; distribution about the same as *I. anil* Linn.

I. trifoliata Linn.

SABTAN, *3724 Féniæ.*

Not common in the Philippines; tropical Asia to southern China, Malaya and Australia, but not known from Formosa.

I. teysmanni Miq.

BATAN, Santo Domingo de Basco, *3190 Mearns.*

Rather common and widely distributed in the Philippines; southern China and Formosa through Malaya to New Caledonia. See Prain and Baker in Journ. Bot. 40 (1902) 143.

VIGNA Savi.

V. luteola (Jacq.) Benth.

CAMIGUIN, *4064 Féniæ.*

Widely distributed in the Philippines; cosmopolitan in the tropics.

OXALIDACEÆ.

OXALIS Linn.

O. repens Thunb.

BATAN, Santo Domingo de Basco, *3209 Mearns; 3591 Féniæ.* N. v., *Pichic.*

Widely distributed in the Philippines; tropical and temperate parts of the World, closely allied to *Oxalis corniculata* Linn.

ZYGOPHYLLACEÆ.

TRIBULUS Linn.

T. cistoides Linn.

FUGA, *3247 Mearns.*

Not common in the Philippines; widely distributed in tropical and warm regions of the World.

RUTACEÆ.

FAGARA Linn.

F. integrifoliola Merr.

BATAN, Santo Domingo de Basco, *3584 Féniæ.* N. v., *Baroc.*

Rather widely distributed in the central and northern Philippines; endemic.

MELICOPE Forst.

M. luzonensis Engl.

BATAN, Santo Domingo de Basco, *3215, 3235 Mearns; 3603 Féniæ.* N. v., *Ydacacayo.*

Common and widely distributed in the Philippines; endemic.

LUNASIA Blanco.

Lunasia babuyanica sp. nov.

Differt a *Lunasia amara* fructibus processibus mollibus dense stellato-tomentosis circiter 5 mm longis obtectis.

A shrub, with the general appearance of *Lunasia amara* Blanco, but with quite different fruits. Branches, branchlets, inflorescence, the lower surface of the leaves and midrib above rather densely pale-stellate-pubescent. Leaves alternate, obovate-oblong, 20 to 30 cm long, 8 to 12 cm wide, submembranous, shining, the apex shortly and abruptly blunt-acuminate, narrowed below toward the acute base, entire, the upper surface stellate-pubescent along the midrib, the lower surface rather densely stellate-pubescent when young, becoming subglabrous in age; nerves about 22 on each side of the midrib, parallel, distinct; petioles 8 to 11 cm long, straight, stellate-pubescent. Panicles slender, narrow, axillary, 20 to 30 cm long, densely stellate-pubescent, the branches scattered, few, the longest ones scarcely exceeding 4 cm in length. Staminate flowers crowded into dense sessile heads 4 to 5 mm in diameter, arranged along the ultimate branchlets. Sepals 3, narrow, stellate-pubescent, about 1 mm long. Petals twice as long as the sepals. Stamens 3. Pistillate flowers not seen. Fruit of three 1 to 1.5 cm long carpels, the outside densely covered with rather soft, 5 mm long, densely stellate-tomentose processes.

CAMIGUIN (Babuyan Islands), *Bur. Sci. 4050 Féniæ*, June 27, 1907, in thickets near the seashore.

A very characteristic species with the facies of *Lunasia amara* Blanco, but at once distinguished by its more pubescent leaves and its fruits being covered with numerous, soft, stellate-tomentose processes about 5 mm long.

Lunasia amara Blanco is very common and widely distributed in the Philippines, and is rather variable in vegetative characters. No representative of the genus is known from outside of the Malayan region.

MICROMELUM Blume.

M. tephrocarpum Turcz.

BATAN, Santo Domingo de Basco, *3647 Féniæ*. CAMIGUIN, *3994 Féniæ*.

A form endemic to the Philippines, scarcely distinct from the widely distributed *Micromelum pubescens* Blume.

MURRAYA Linn.

M. exotica Linn.

CAMIGUIN, *4114 Féniæ*.

Common and widely distributed in the Philippines; tropical Asia to Formosa, Malaya, Australia and Polynesia.

M. crenulata Oliv.

SABTAN, *3742 Féniæ*.

A species known only from the Philippines, not common.

CITRUS Linn.

C. hystrix DC.

BATAN, Santo Domingo de Basco, *3836 Féniæ*. N. v., *Valatino*.

Widely distributed in the Philippines; British India to Malaya.

MELIACEÆ.

CHISOCHETON Blume.

C. philippinus (Turcz.) Harms.

CAMIGUIN, *4046 Féniæ*.

Common and widely distributed in the Philippines; endemic.

AGLAIA Lour.

Aglaia ellipttfolia sp. nov. § *Euaglaia.*

Arbor parva, usque ad 5 m alta, ramulis ramis paniculisque dense ferrugineo-lepidotis; foliis imparipinnatis, 2-jugatis, 20 ad 25 cm longis; foliolis submembranaceis, ellipticis, 8 ad 15 cm longis, pallidis, subtus plus minus lepidotis, apice rotundatis; paniculis usque ad 25 cm longis, multifloris; floribus spicatis, pedicellatis; staminibus 6 vel 5.

A small tree, 5 m high or less. Branches and branchlets densely ferruginous-lepidote, the younger parts often cupreous. Leaves 20 to 25 cm long, odd-pinnate, 2-, rarely 3-jugate, the rachis and petioles lepidote; leaflets elliptical, 8 to 15 cm long, 5 to 8 cm wide, pale, submembranous, rounded at both ends, or the base subacute, glabrous above, beneath lepidote, especially on the midrib and nerves; nerves about 9 on each side of the midrib, anastomosing, the reticulations lax; petiolules 5 to 7 mm long, that of the terminal leaflet longer. Panicles axillary, about as long as the leaves, densely lepidote, the lower branches 10 cm long or less. Flowers yellow, racemosely disposed on the ultimate branchlets, many, pedicellate, their pedicels lepidote, 1 to 2 mm long. Sepals 5, orbicular-reniform, rounded, lepidote, about 1 mm long. Petals 5, imbricate, glabrous, orbicular-ovate or elliptical, rounded, 2.5 to 3 mm long, free from the staminal tube. Staminal tube 2 mm long, obscurely toothed. Stamens 6; anthers triangular-ovate, 0.8 mm long, sessile, inserted on the inner upper portion of the tube, almost marginal, suberect or somewhat inflexed.

SABTAN, *Bur. Sci. 3733 Fénix*, June 4, 1907. CAMIGUIN, *3984 Fénix*. June 21, 1907. BABUYAN, *3909 Fénix*, June 17, 1907. In addition to the above specimens, one from Y'Ami Island, the most northern point in the Philippines, *Bur. Sci. 4152 Fénix*, may be referable here, but has longer petiolules and obscurely acuminate leaflets, in the latter respect approaching *Aglaia denticulata* Turcz.

A species apparently most closely allied to *Aglaia denticulata* Turcz., but at once distinguished by its elliptical, rounded, not acuminate leaflets, and other characters. Its anthers are inserted so close to the margin of the staminal tube, that it might almost be referred to the section *Hearnia.*

Aglaia elaeagnoidea Benth., var. **pallens** var. nov.

A typo differt foliolis minoribus, angustioribus, apice non cuspidatis, ramis ramulis paniculis foliisque densissime pallido lepidotis. Foliis imparipinnatis, 2-jugatis; foliolis 3 ad 5 cm longis, 1 ad 2 cm latis, breviter obscure acuminatis, basi inaequilateralibus, decurrento-acuminatis.

CAMIGUIN, *4122 Fénix*, along the seashore. BATAN, Santo Domingo de Basco, *3831 Fénix.*

Typical *Aglaia elaeagnoidea* Benth. has not been found in the Philippines as yet, its range according to C. DeCandolle being from Java to Australia and New Caledonia. The variety *formosana*, recently described from Formosa by Hayata, is well characterized by its long panicles (20 to 30 cm). The variety above described appears to be quite distinct from Javan material in our herbarium that apparently well represents Bentham's species, and comparison with type material may warrant giving the present form specific rank. The wood is said to be very hard.

EUPHORBIACEÆ.

PHYLLANTHUS Linn.

P. nirurl Linn.

BATAN, Santo Domingo de Basco, *3722 Fénix*.

Common throughout the Philippines; widely distributed in the tropics of the World.

P. reticulatus Poir.

CAMIGUIN, *3967 Fénix*.

Abundant throughout the Philippines; tropical Asia, Africa, Malaya, and northern Australia.

GLOCHIDION Forst.

Glochidion camiguinense sp. nov. § *Hemiglochidion*.

Arbor parva, 5 ad 6 m alta, glabra; foliis alternis, oblongo-ovatis vel elliptico-ovatis, pallidis, chartaceis, breviter acuminatis, leviter falcatis, usque ad 7 cm longis, nervis utrinque 9; floribus masculinis 6-meris, circiter 2 mm longis; antheris 3, erectis, connatis; floribus femineis 6-meris; ovario glabro, 5-loculare.

A small tree 5 to 6 m high, glabrous throughout. Branches terete, grayish, lenticellate, the branchlets brownish, somewhat angular. Leaves alternate, oblong-ovate to elliptical-ovate, pale, chartaceous, 5 to 7 cm long, 2 to 3 cm wide, somewhat falcate, the base rounded, inequilateral, the apex short-acuminate; nerves about 9 on each side of the midrib; petioles 2 to 3 mm long. Flowers axillary, fascicled, short-pedicelled, few in each axil. Staminate flowers: sepals 6, the outer ones 2 mm long, the inner slightly smaller; anthers 3, erect, connate, 1 mm long. Pistillate flowers similar in size to the staminate ones, the sepals 6. Ovary ovoid, glabrous, 5-celled, each cell 2-ovuled; style as thick as the ovary and not differentiated from it, depressed at the apex. Fruit depressed-globose, white, according to the collector, glabrous, 5-ridged, about 1 cm in diameter; seeds red when fresh.

CAMIGUIN, *Bur. Sci. 4108 Fénix*, June 21, 1907. I am also disposed to refer here a specimen from the same island, *Fénix 4026*, with less pale leaves, and the style not so thick as the ovary.

Glochidion feniels sp. nov. § *Euglochidion*.

Arbor parva, 6 ad 7 m alta, glabra; foliis submembranaceis, oblongo-ovatis, usque ad 16 cm longis, longe temuiter acuminatis, basi inaequilater rotundatis, nitidis, nervis utrinque 6 vel 7; floribus axillaribus, fasciculatis, circiter 1.5 mm longis; calycis segmentis 5; staminibus 5, antheris erectis connatis; fructibus glabris, depresso-globosis, circiter 5 mm diam.

A small tree 6 to 7 m high, glabrous throughout. Branches gray, terete, the branchlets reddish-brown, slender, the tips more or less angled. Leaves oblong-ovate, submembranous, 10 to 16 cm long, 5 to 6 mm wide, the base rather broad, inequilateral, rounded, narrowed upwards, the apex rather long and slenderly acuminate, shining, the lower surface slightly paler than the upper; nerves 6 or 7 on each side of the midrib, curved-ascending, obscurely anastomosing, rather distinct beneath; petioles 4 mm long or less. Flowers axillary, fascicled, pedicellate. Sepals 5, imbricate, ovate, 1.5 mm long. Stamens 5, the anthers erect, apiculate, 1.2 mm long, connate. Pistillate flowers 6-merous. Calyx segments 6, ovate, slightly acuminate, glabrous. Ovary ovoid, glabrous, depressed at the apex, the stylar column 6-fid, obscurely lobulate, 0.4 mm long, wider than long and inserted in the depressed apex of the ovary. Fruit yellowish, glabrous, depressed-globose, about 5 mm in diameter, with 10, very obscure, rounded ridges.

BATAN, Santo Domingo de Basco, *Bur. Sci. 3696 Fénix*, June 1, 1907. N. v., *Annam*.

Apparently most closely allied to *Glochidion arnottianum* Muell. Arg., of southern China and Hongkong, but with quite different vegetative characters.

FLUGGEA Willd.

F. virosa (Roxb.) Baill. (*F. obovata* Wall.)

CAMIGUIN, *4011 Fénix*.

Widely distributed in the Philippines; tropical Asia, Africa, Malaya, and Australia.

BREYNIA Forst.

B. cernua Muell. Arg.

CAMIGUIN, *3997 Fénix*. BATAN, Santo Domingo de Basco, *3718 Fénix*. N. v., *Antimantinid*.

Widely distributed in the Philippines; Malaya.

CYCLOSTEMON Blume.

Cyclostemon falcatus sp. nov. § *Eucyclostemon ?*

Arbor parva, fructibus exceptis glabra; ramis ramulisque griseis, teretibus; foliis coriaceis, nitidis, oblongis vel oblongo-ovatis, usque ad 10 cm longis, valde inaequilateralibus, falcatis, basi acutis, apice obtusis vel rotundatis, margine integris; floribus femineis axillaribus, solitariis, pedicellatis; fructibus 1 ad 1.5 cm longis, ovoideis, pubescentibus, 2-locularibus, exocarpio coriaceo.

A small tree or shrub 3 to 5 m high, glabrous except the fruits. Branches and branchlets pale-gray, terete. Leaves alternate, oblong or oblong-ovate, 6 to 10 cm long, 3 to 4.5 cm wide, coriaceous, shining, entire, very strongly inequilateral, falcate, the apex obtuse or rounded, the base inequilateral, acute; nerves 7 or 8 on each side of the midrib, distant, irregular, anastomosing, scarcely more distinct than are the secondary ones and reticulations, the reticulations obscure above, distinct beneath; petioles stout, about 5 mm long. Flowers unknown. Fruit axillary, solitary, pedicelled, the pedicels 5 to 7 mm long, subtended at the base by several small, pale bracts, the fruits ovoid, 1 to 1.5 cm long, obtuse, gray or brownish, with numerous somewhat appressed short hairs, the pericarp coriaceous, 2-celled, each cell with two ovules.

CAMIGUIN, *Bur. Sci. 4033 Féniæ*, June 22, 1907, along the seashore.

A species well characterized by its 2-celled ovary and very strongly inequilateral, falcate, obtuse leaves. The genus is well developed in the Philippines, with 6 or 7 species, but no representative is known from Formosa or southern China.

ANTIDESMA Linn.

A. lobbianum Muell. Arg.

BATAN, Santo Domingo de Basco, *3656 Féniæ*. CAMIGUIN, *3996 Féniæ*.

Widely distributed in the Philippines; endemic.

A. cumingii Muell. Arg.

CAMIGUIN, *4079 Féniæ*.

Widely distributed in the Philippines; endemic. *A. membranaefolium* Elm., recently described, is quite the same.

CLEISTANTHUS Hook.

C. ovatus C. B. Robinson in Philip. Journ. Sci. 3 (1908) Bot. 194.

CAMIGUIN, *4051 Féniæ*, (type).

Known only from this one collection. This genus has about 13 representatives in the Philippines, but none are known from southern China or Formosa.

CLAOXYLON Juss.

C. rubescens Miq., var. **meyenianum** Muell. Arg.

BATAN, Santo Domingo de Basco, *3639 Féniæ*.

The species widely distributed in the Malayan region, the variety known only from the Philippines where it is common and widely distributed.

MALLOTUS Lour.

M. leucocalyx Muell. Arg.

CAMIGUIN, *4047 Féniæ*.

Known only from the Philippines, the above specimen agreeing in all essential characters with typical material from Mindanao.

M. moluccanus Muell. Arg.

BATAN, Santo Domingo de Basco, *3714 Féniæ*. N. v., *Ajem*.

Very common and widely distributed in the Philippines; tropical Asia to Formosa and Malaya.

M. philippinensis (Lam.) Muell. Arg.

CAMIGUIN, *4112 Féniæ*.

Very common and widely distributed in the Philippines; tropical Asia to Formosa, Malaya, northern Australia and eastern Polynesia.

M. playfairii Hemsl.

CAMIGUIN, *4024 Féniæ*.

Luzon; Formosa and northern Borneo.

M. ricinoides (Pers.) Muell. Arg.

BATAN, Santo Domingo de Basco, *3769 Fénix*; *3202 Mearns*. CAMIGUIN, *3942 Fénix*. N. v., *Vanaiti*.

Widely distributed in the Philippines; Tenasserim to southern China.

MACARANGA Thouars.

M. tanarius (Linn.) Muell. Arg.

CAMIGUIN, *3990 Fénix*, a luxuriant form.

Widely distributed in the Philippines; southern China, the Riu Kiu Archipelago and Formosa, throughout Malaya.

M. cumingii Muell. Arg.

BATAN, near the summit of Mount Iraya, *3772 Fénix*. N. v., *Vanati*.

Widely distributed in the Philippines; endemic.

ACALYPHA Linn.

A. indica Linn.

BATAN, Santo Domingo de Basco, *3219 Mearns*.

A common weed throughout the Philippines; tropical Asia and Africa to Malaya and Polynesia.

A. grandis Benth., var. **velutina** Muell. Arg.

BATAN, Santo Domingo de Basco, *3192*, *3194*, *3225 Mearns*.

With several varieties in Malaya and Polynesia, the above variety confined to the Philippines.

A. stipulacea Klotz.

BATAN, Santo Domingo de Basco, *3607 Fénix*; *3206 Mearns*. CAMIGUIN, *4084 Fénix*. N. v., *Ajas*.

The above specimens represent luxuriant forms of the species, with large bracts and large leaves, the latter sometimes cordate at the base. One specimen, *Fénix 3607*, is peculiar in having both staminate and pistillate flowers on the same plant, but it is certainly the same as the other specimens here cited. Very common and widely distributed in the Philippines; Malaya.

RICINUS Linn.

R. communis Linn.

BATAN, Santo Domingo de Basco, *3569 Fénix*. N. v., *Catanó*.

Widely distributed in the Philippines; tropical and temperate regions of the World, cultivated and spontaneous.

HOMALANTHUS Juss.

H. fastuosus (Muell. Arg.) F.-Vill.

BATAN, near the summit of Mount Iraya, *3771 Fénix*. N. v., *Tanúgtug*.

Widely distributed in the Philippines at medium and higher altitudes; known only from the Philippines.

EUPHORBIA Linn.

E. atoto Forst.

SABTAN, *3725 Fénix*. FUGA, *3242 Mearns*.

Along the seashore throughout the Philippines; Ceylon to Formosa, Malaya, northern Australia and Polynesia.

E. pilulifera Linn.

BATAN, Santo Domingo de Basco, *3597 Féniæ*. CAMIGUIN, *3941 Féniæ*. N. v., *Tairas*.

Common throughout the Philippines; tropics of the World.

E. serrulata Reinw.

CAMIGUIN, *4016 Féniæ*.

Widely distributed in the Philippines; Riu Kiu Archipelago to Formosa, southern China and Malayan Archipelago.

E. thymifolia Linn.

BATAN, Santo Domingo de Basco, *3710 Féniæ*.

A weed in and about towns throughout the Philippines; tropics of the World.

ANACARDIACEÆ.

SEMECARPUS Linn. f.

S. sp.

BATAN, Santo Domingo de Basco, *3610 Féniæ*. Leaf specimens only, not matched by any of the species in our herbarium but allied to *Semecarpus perrottetii* March. Said to be poisonous, as is the case with *S. perrottetii* March. N. v., *Anias*.

STAPHYLEACEÆ.

TURPINIA Vent.

T. pomifera DC.

BATAN, Santo Domingo de Basco, *3778 Féniæ*. N. v., *Malaoatigui*.

Common and widely distributed in the Philippines; widely distributed in tropical Asia, and Malaya.

ICACINACEÆ.

GONOCARYUM Miq.

G. calleryanum (Baill.) Becc.

CAMIGUIN, *3987 Féniæ*.

Widely distributed in the Philippines; endemic.

SAPINDACEÆ.

CARDIOSPERMUM Linn.

C. halicacabum Linn.

BATAN, Santo Domingo de Basco, *3604 Féniæ; 3213 Mearns*.

Common and widely distributed in the Philippines; widely distributed in the tropics of the World.

ELATTOSTACHYS Radlk.

E. verrucosa (Bl.) Radlk.

FUGA, *3250 Mearns*.

Widely distributed in the Philippines; Java, Timor, etc., but not found in southern China or Formosa.

POMETIA Forst.

P. pinnata Forst.

CAMIGUIN, *4081 Féniæ*.

Widely distributed in the Philippines; eastern Malaya to New Guinea and Polynesia.

RHAMNACEÆ.

COLUBRINA L. C. Rich.

C. asiatica (Linn.) Brongn.
Camiguin, *4093 Fénix.* Sabtan, *3761 Fénix*
Common near the sea throughout the Philippines; India to Africa, Formosa, Malaya, Australia, and Polynesia

VITACEÆ.

LEEA Linn.

L. philippinensis Merr.
Sabtan, *3756 Fénix.* N. v., *Niblaoen*
Widely distributed in Luzon, endemic.

L. manillensis Walp
Batan, Santo Domingo de Basco, *3582 Fénix* N v, *Vodadin.*
Widely distributed in the Philippines, endemic

L. aculeata Blume.
Camiguin, *3945 Fénix*
Widely distributed in the Philippines; Malaya

AMPELOPSIS Michx

A. heterophylla (Thunb.) Planch.
Sabtan, *Petrelli s. n* Camiguin, *4062 Fénix.*
Widely distributed in the Philippines, Japan to southern China and Formosa

MALVACEÆ.

HIBISCUS Linn

H. tiliaceus Linn.
Batan, Santo Domingo de Basco, *3713 Fénix* Camiguin, *3991 Fénix.* N. v, *Janót.*
Common along the seashore throughout the Philippines; tropics of both hemispheres.

ABELMOSCHUS Medic.

A. moschatus Moench.
Camiguin, *4055 Fénix.*
Widely distributed in the Philippines; tropical Asia, and Malaya, cultivated in other tropical countries.

THESPESIA Corr.

T. populnea (Linn.) Corr.
Batan, Santo Domingo de Basco, *3616 Fénix.*
Widely distributed in the Philippines; tropical Asia, Africa, Malaya, and Polynesia, but not known from southern China or Formosa.

MALVASTRUM A. Gray.

M. coromandelinum (Willd.) Garke.
Batan, Santo Domingo de Basco, *3598 Fénix.*
Widely distributed in the Philippines; tropics generally.

URENA Linn.

U. lobata Linn., var. **scabriuscula** A. Gray.
BATAN, Santo Domingo de Basco, *3660 Fénix*. CAMIGUIN, *4025 Fénix*.
Common throughout the Philippines; British India.

SIDA Linn.

S. rhombifolia Linn.
BATAN, Santo Domingo de Basco, *3600 Fénix* CAMIGUIN, *3954 Fénix*.
Common throughout the Philippines; tropics generally.

STERCULIACEÆ.

MELOCHIA Linn.

M. corchorifolia Linn
CAMIGUIN, *3957 Fénix*
Throughout the Philippines; tropics generally

ABROMA Linn. f

A. augusta Linn. f.
CAMIGUIN, *3946 Fénix*. BATAN, Santo Domingo de Basco, *3608 Fénix*. N. v., *Neguegan*.
Widely distributed in the Philippines; tropical Asia and Malaya.

KLEINHOFIA Linn.

K. hospita Linn.
CAMIGUIN, *3999 Fénix*.
Throughout the Philippines; tropical Asia, Africa, and Malaya

STERCULIA Linn.

S. oblongata R. Br.
CAMIGUIN, *Worcester s. n.* BATAN, *3712 Fénix*. N. v., *Jantéo*.
Widely distributed in the Philippines; Celebes

S. montana Merr.
CAMIGUIN, *4113 Fénix*, in forests on the slopes of the volcano; previously known only from Mount Mariveles, Luzon.

DILLENIACEÆ.

DILLENIA Linn.

D. philippinensis Rolfe.
CAMIGUIN, *4146 Fénix*
Common and widely distributed in the Philippines; endemic.

GUTTIFERÆ.

CALOPHYLLUM Linn.

C. inophyllum Linn.
BATAN, Santo Domingo de Basco, *3716 Fénix*. CAMIGUIN, *4090 Fénix*. N. v., *Vultalao*.
Seashores throughout the Philippines; tropics of the World.

C. blancoi Pl. & Tr.
BATAN, Santo Domingo de Basco, *3818 Mearns*.
Widely distributed in the Philippines; endemic.

GARCINIA Linn.

G. lateriflora Blume.
Camiguin, *4142 Fénix.*
Rather widely distributed in the Philippines; Java.

THEACEÆ.

EURYA Thunb.

E. japonica Thunb.
Batan, *3800 Fénix.*
Throughout the Philippines at higher altitudes; Japan to India, Malaya and Polynesia.

PASSIFLORACEÆ.

ADENIA Forsk.

A. coccinea (Blanco) comb. nov.
Modecca coccinea Blanco Fl. Filip. ed. 2 (1845) 453.
Camiguin, *4059 Fénix.* Fuga, *3248 Mearns.*
Widely distributed in the Philippines; endemic.

BEGONIACEÆ.

BEGONIA Linn.

Begonia fenicis Merrill sp. nov. § *Diploclinium.*

Glabra, caudice repente; foliis oblique ovato-orbicularibus, acuminatis, irregulariter dentatis, cordatis, palmatim 7-9-nerviis, glabris; stipulis ovatis, brunneis, membranaceis, acuminatis, usque ad 1 cm longis; pedunculis erectis, foliis æqualibus vel longioribus apice dichotomis, bracteis caducis; floribus masculinis sepalis orbiculari-ovatis, 8 mm longis; capsulis trialatis, 12 ad 14 mm longis.

Glabrous throughout. Stem prostrate, rather thick, covered with numerous ovate, brown stipules. Leaves obliquely ovate-orbicular, membranous, 5 to 11 cm long, the apex rather sharply acuminate, the base cordate, the sinus narrow, the basal lobes rounded, margins irregularly dentate, the teeth small, apiculate; nerves 7 to 9; stipules ovate to broadly ovate, acuminate, brown, 1 cm long or less, petioles 6 to 13 cm long. Peduncles erect, equaling or exceeding the leaves, dichotomously branched above. Staminate flowers; sepals 2, orbicular-ovate, rounded, membranous, white or pale pink, 8 mm long. Petals 2, similar to the sepals but smaller. Stamens about 20; anthers oblong-obovoid, 1 to 1.2 mm long, the filaments 1 to 2 mm long. Pistillate flowers similar in size and color to the staminate; styles 3, 3.5 mm long or less, the stigmas papillose. Capsule 12 to 14 mm long, ovate to orbicular-ovate in outline, triangular, rounded at the base, the apex broad, somewhat apiculate, 3-winged, the wings 2.5 to 5 mm wide.

Batan, Santo Domingo de Basco, *Bur. Sci. 3619 Fénix*, May 30, 1907, *3207*

Mearns, May 27, 1907, on rocky hillsides. BABUYAN, *3393 Fénix*, June 17, 1907. N. v., *Tapait*.

A species allied to *Begonia rhombicarpa* A. DC., but entirely glabrous, with larger more numerously nerved leaves, larger flowers and fruits and with much larger differently shaped stipules, the numerous brown stipules which nearly cover the stems being a striking characteristic of the present species.

THYMELAEACEÆ.

WIKSTROEMIA Endl.

W. viridiflora Meisn.

BATAN, Santo Domingo de Basco, *3566 Fénix; 3233 Mearns*. N. v., *Titipukó*.

Southern China and the Philippines.

LYTHRACEÆ.

PEMPHIS Forst.

P. acidula Forst.

SABTAN, *3727 Fénix*. N. v., *Palupó*.

Along the seashore throughout the Philippines; eastern Africa, tropical Asia to Formosa, Malaya, Australia and Polynesia.

LAGERSTROEMIA Linn

L. speciosa (Linn.) Pers.

BATAN, Santo Domingo de Basco, *3220 Mearns*.

Common throughout the Philippines; British India to southern China, Malaya and northern Australia.

LECYTHIDACEÆ.

BARRINGTONIA Forst.

B. racemosa (Linn.) Roxb.

CAMIGUIN, *3983 Fénix*.

Near the seashore throughout the Philippines; British India to Formosa, Malaya and Polynesia.

B. asiatica (Linn.) Kurz.

FUGA, *3254 Mearns*.

Along the seashore throughout the Philippines; Malay Peninsula and Archipelago to Formosa and Polynesia.

COMBRETACEÆ.

TERMINALIA Linn.

T. catappa Linn.

BATAN, Santo Domingo de Basco, *3690 Fénix*. N. v., *Savadig*.

Common near the sea throughout the Philippines; British India to Formosa, Malaya and Polynesia, cultivated in many other tropical countries.

QUISQUALIS Linn.

Q. indica Linn.

CAMIGUIN, *3958 Fénix*.

Throughout the Philippines, common; tropical Asia to Formosa and Malaya.

MYRTACEÆ.

RHODOMYRTUS DC.

R. tomentosa (Ait.) Hassk.

CAMIGUIN, *4129 Fénix*.

Rare in the Philippines, southern China and Formosa to India and Malaya.

EUGENIA Linn

Five species of the genus are represented in the collections of Fénix and Mearns, apparently mostly undescribed. Specific identifications have not been attempted at this time, as the Philippine species of this genus are now undergoing revision.

DECASPERMUM Forst.

D. paniculatum (Lindl.) Kurz.

SABTAN, *3741 Fénix*

Very common in the Philippines, tropical Asia to Malaya and Australia.

MELASTOMATACEÆ.

ASTRONIA Blume

A. cumingiana Vidal

BATAN, Mount Iraya, *3782 Fénix*. N. v., *Busonsen*.

Widely distributed in the Philippines at higher altitudes, Celebes

MEDINILLA Blume.

M. magnifica Lindl.

BATAN, near the summit of Mount Iraya, *3820 Fénix* CAMIGUIN, *4151 Fénix*, near the summit of the volcano.

Widely distributed in the Philippines; endemic

MELASTOMA Linn.

M. polyanthum Blume

SABTAN, *3748 Fénix*. BABUYAN, *3923 Fénix*

Common and widely distributed in the Philippines, India to southern China, Malaya, and northern Australia.

Melastoma membranaceum Merrill sp nov

Frutex erecta, 1 ad 1.5 m alta; ramis, ramulis, foliis subtus ad nervos, petiolisque squamulis sparsis ovatis, rariter lanceolatis, adpressis obtectis; foliis ovato-lanceolatis, acuminatis, 9 ad 15 cm longis, 5-nerviis, membranaceis, nitidis, supra glabris; calycis lobis tubo longioribus, dentibus subulatis ciliatis apice penicillato-setosis alternantibus; calyce paleolis lanceolatis pauce ciliatis, non fasciculatis, adpressis, dense obtecto; floribus 5-meris, circiter 4 cm longis.

An undershrub 1 to 1.3 m high, with few branches, the branches and branchlets terete or somewhat compressed, light-gray or brownish, with few scattered ovate appressed scales. Leaves ovate-lanceolate, 9 to 15 cm long, 4 to 6 cm wide, base acute or rounded, apex acuminate, membranaceous, somewhat shining, beneath on the nerves with few appressed ovate, rarely lanceolate scales, above glabrous; nerves 5, prominent, the transverse nervules numerous, curved upwards; petioles with few appressed scales, 1.5 to 2.5 cm long. Flowers in threes, the inflorescence terminal, 6 cm long. Calyx about 12 mm long, 8 mm thick, densely covered with imbricated, appressed, penicillate-acuminate slightly ciliate 1.2 mm long scales, the lobes 5, oblong-lanceolate, 1.8 cm long, 7 mm wide, penicillate-acuminate, the back densely scaly, the margins with scattered penicillate hairs, the alternating teeth 3 mm long, tipped with about three penicillate hairs. Petals obovate, obtuse, about 3 cm long, 2.4 cm wide, the apical margin ciliate, 7-nerved. Stamens 10, the longer ones with filaments about 2 cm long including the connective, the appendages about 2 mm long; anthers 11 mm long. Bracts ovate-lanceolate, acuminate, 2 cm long, densely paleaceous, the bracteoles similar, about 1.5 cm long.

BATAN, Santo Domingo de Basco, *Bur. Sci. 3798 Fénix*, June 8, 1907. CAMIGUIN, *Bur. Sci. 4109 Fénix*, July 3, 1907.

A species evidently allied to *Melastoma penicillatum* Naud., and *M. paleaceum* Naud., but with calyx scales more like species in the group with *M. polyanthum*, characterized by its membranaceous nearly glabrous leaves

UMBELLIFERÆ.

CENTELLA Linn.

C. asiatica (Linn.) Urb.

BATAN, Santo Domingo de Basco, *3628 Fénix*. CAMIGUIN, *3966 Fénix*. N. v., *Tagaditao*.

Common throughout the Philippines; tropical and subtropical regions of the World.

SCHEFFLERA Forst.

S. odorata (Blanco) Merr & Rolfe.

SABTAN, *3753 Fénix*. N v., *Tugyio*.

Widely distributed in the Philippines; endemic

BOERLAGIODENDRON Harms

B. camiguinense Merr. in Philip Journ. Sci. 3 (1908) Bot. 252.

CAMIGUIN, *4135 Fénix*.

Known only from Camiguin.

B. pectinatum Merr. l. c. 253.

BATAN, Mount Iraya, *3775 Fénix*.

Known only from Batan; the two most northern known species of the genus.

ONAGRACEÆ.

JUSSIEUA Linn.

J. suffruticosa Linn.

CAMIGUIN, *3971 Fénix*.

Widely distributed in the Philippines; tropics of the World.

MYRSINACEÆ.

MAESA Forsk.

M. denticulata Mez.

BATAN, Santo Domingo de Basco, *3205 Mearns; 3640 Fénix.*

Widely distributed and common in the Philippines; endemic.

AEGICERAS Gaertn.

A. corniculatum (Linn.) Blanco.

FUGA, *3255 Mearns.*

Along the seashore throughout the Philippines; British India to southern China, Malaya, and Australia. Not reported from Formosa.

ARDISIA Sw.

A. humilis (Burm.) Vahl.

BATAN, Santo Domingo de Basco, *3214, 3216 Mearns; 3589 Fénix.* Fuga, *3245 Mearns.* N. v., *Pain.*

Common and widely distributed in the Philippines; India to southern China and Malaya.

PRIMULACEÆ.

LYSIMACHIA Linn.

L. mauritiana Lam. Encycl. 3 (1789) 572; Pax & Knuth, Pflanzenreich 22 (1905) 273.

L. linearilobа Hook. & Arn. Bot. Beechey Voy. (1841) 268; Duby in DC. Prodr. 8 (1844) 61; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1889) 53; Mats. & Hayata Enum. Pl. Formosa (1906) 221.

BATAN, Santo Domingo de Basco, *3197, 3188 Mearns.*

British India to Japan, Formosa, Mauritius, Hawaiian Islands, Polynesia, and New Caledonia. Not previously reported from the Philippines; the fifth species of the genus to be found in the Archipelago.

SAPOTACEÆ.

PALAQUIUM Blanco.

P. bataanense Merr.

BATAN, Santo Domingo de Basco, *3668 Fénix.* CAMIGUIN, *4101 Fénix.* N. v., *Natú.*

Luzon.

EBENACEÆ.

MABA Forst.

M. buxifolia (Rottb.) Pers.

CAMIGUIN, *4117, 3768 Fénix.*

Widely distributed in the Philippines; tropical Asia, Africa, and Australia, Malaya and Polynesia. Not known from southern China or Formosa.

DIOSPYROS Linn.

D. discolor Willd.

BATAN, Santo Domingo de Basco, *3145 Mearns; 3839 Fénix.* N. v., *Camaya.*

Widely distributed in the Philippines, native and cultivated; Borneo. Cultivated in other tropical countries.

D. pilosanthera Blanco.
CAMIGUIN, *4000 Fénix*.
Widely distributed in the Philippines; endemic.

D. maritima Blume Bijdr. (1825) 669; Hiern Monog. Eben. (1873) 211.
FUGA, *3251 Mearns*.
Here first credited to the Philippines, but represented in our herbarium by many specimens from various parts of the Archipelago; widely distributed in Malaya, extending to northern Australia.

Diospyros sabtanensis Merrill sp. nov. § *Ermellinus*.

Frutex 4 ad 5 m alta; foliis alternis, papyraceis, ellipticis, oblongo-ellipticis, vel obovato-ellipticis, apice obtusis, basi acutis, 6 ad 12 cm longis, supra nitidis; nervis utrinque 7 vel 8; floribus femineis axillaribus, sessilibus, solitariis vel binis, pubescentibus, 4-meris, tubo cylindraceo; staminodiis 8; ovario ovoideo, 8-loculari, loculis 1-ovulatis.

A shrub 4 to 5 m high. Branches and branchlets terete, brown, the former glabrous, the latter somewhat pubescent. Leaves alternate, papyraceous, elliptical, oblong-elliptical or obovate-elliptical, 6 to 12 cm long, 2.5 to 6 cm wide, the apex obtuse, the base acute, glabrous and shining on the upper surface, beneath glabrous or with very few scattered hairs; nerves 7 or 8 on each side of the midrib, distinct, anastomosing, the reticulations distinct, netted; petioles glabrous or slightly pubescent, 5 to 9 mm long. Pistillate flowers axillary, solitary or in pairs, sessile. Calyx broadly funnel-shaped, pubescent, the tube short, 3 mm in diameter, the lobes 4, orbicular, accrescent, pubescent, rounded, the margins reflexed. Corolla about 12 mm long, the tube cylindrical, about 6 mm long, 4.5 mm in diameter, appressed-pubescent outside, glabrous within, the lobes 4, erect in bud, in anthesis spreading, oblong-ovate or elliptical, blunt, coriaceous, glabrous inside, the median portion outside appressed-pubescent. Staminodes 8, about 4.5 mm long. Ovary ovoid, narrowed above, pubescent, 8-celled, each cell 1-ovuled; styles 5, about 3 mm long. Staminate flowers axillary, fascicled, sessile or subsessile, pubescent. Calyx cupular, 5 mm long, the teeth 4, ovate, acute. Corolla about 10 mm long. Stamens 12 to 14, unequal, 2-seriate; anthers narrowly lanceolate, apiculate, glabrous, 3 to 4 mm long, the cells dehiscing by lateral slits. Rudimentary ovary none.

SABTAN, *Bur. Sci. 3765, 3757 Fénix*, June 4, 1907, along mountain streams, the flowers yellow. N. v., *Canarem*.

A species probably allied to *Diospyros carthei* Hiern, but differing from it in many characters.

SYMPLOCACEÆ.

SYMPLOCOS Jacq.

S. ferruginea Roxb., var. **philippinensis** Brand.
CAMIGUIN, *4153 Fénix*.
The variety known only from the Philippines, the species widely distributed from India to southern China and Malaya.

GENTIANACEÆ.

ERYTHRAEA Rich.

E. spicata (Linn.) Pers. Syn. 1 (1805) 283; DC. Prodr. 9 (1845) 60; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 122; Mats. & Hayata Enum. Pl. Formosa (1906) 242.

Gentiana spicata Linn. Sp. Pl. (1753) 333.

BATAN, Santo Domingo de Basco, *3142*, *3144*, *3231 Mearns*, May 27, 1907.

No representative of the genus has previously been found in the Philippines, and the present one has no doubt been introduced by way of Formosa.

Mediterranean region; introduced into Formosa, probably by early Portuguese colonists.

OLEACEÆ.

LINOCIERA Sw.

L. cumingiana Vidal.

FUGA, *3249 Mearns*. SABTAN, *3755 Fénix*. N. v., *Vasango*

Widely distributed in the Philippines, endemic. A species of doubtful value.

LOGANIACEÆ.

FAGRAEA Thunb.

F. obovata Wall.

CAMIGUIN, *4123 Fénix*.

Widely distributed in the Philippines; India to Malaya. No species of the genus is reported from Formosa or China.

GENIOSTOMA Forst.

Geniostoma batanense Merrill sp. nov.

Arbuscula 2 ad 3 m alta, inflorescentiis exceptis glabra; ramis ramulisque teretibus, griseis; foliis elliptico-ovatis vel oblongo-ovatis, submembranaceis, nitidis, 5 ad 8 cm longis, apice acuminatis, basi acutis, nervis utrinque 5 vel 6, subprominentibus; cymis axillaribus, fasciculatis, paucifloris, parce pubescentibus, circiter 1 cm longis; floribus circiter 3 mm longis.

A shrub 2 to 3 m high, glabrous except the inflorescence. Branches and branchlets terete, glabrous, light-gray. Leaves elliptical-ovate to oblong-ovate, 5 to 8 cm long, 2 to 3 cm wide, submembranous, blackish when dry, somewhat shining, the apex acuminate, the base acute; nerves 5 or 6 on each side of the midrib, rather distinct beneath, anastomosing, the reticulations nearly obsolete; petioles 5 to 8 mm long. Cymes axillary, fascicled, slightly pubescent or puberulent, about 1 cm long, few-flowered, the bracts and bracteoles ovate, similar, about 0.5 mm long. Calyx slightly pubescent, the lobes ovate, blunt or acute, 1 mm long. Corolla 3 mm long, the throat densely villous inside, the lobes about 1.5 mm long, ovate, reflexed, acute. Anthers 0.8 mm long. Ovary globose; style short; stigma ovoid, 0.6 mm in diameter.

BATAN, Santo Domingo de Basco, *Bur. Sci. 3795 Fénix*, June 8, 1907. N. v. *Gagadang*.

A species allied to *Geniostoma cumingianum* Benth., but with larger leaves, and different inflorescence.

APOCYNACEÆ.

LOCHNERA Reichb.

L. rosea (Linn.) Reichb.

BATAN, Santo Domingo de Basco, *3135*, *3196 Mearns.*

Common, especially along the seashore, throughout the Philippines; a native of tropical America, now widely distributed in the tropics of the World.

TABERNAEMONTANA Linn.

T. pandacaqui Poir.

BATAN, Santo Domingo de Basco, *3669 Fénix.*

Common and widely distributed in the Philippines; endemic

T. cumingiana A DC.

CAMIGUIN, *3998 Fénix.*

Common and widely distributed in the Philippines, Formosa and (?) Java.

PARSONSIA R. Br.

P. confusa Merr.

BATAN, Santo Domingo de Basco, *3626 Fénix* N. v., *Devas*

Known only from the Philippines.

CERBERA Linn.

C. odollam Gaertn.

CAMIGUIN, *4007 Fénix.*

Along the seashore throughout the Philippines; seashores, India to Formosa, Malaya, Australia, and Polynesia.

ASCLEPIADACEÆ.

ASCLEPIAS Linn.

A. curassavica Linn.

BATAN, Santo Domingo de Basco, *3572 Fénix.* N. v., *Daldal.*

Throughout the Philippines; a native of tropical America, now distributed throughout the warmer parts of the World

GYMNEMA R. Br.

G. pachyglossum Schltr.

BABUYAN, *3904 Fénix*, along the seashore.

Known only from the Philippines.

TYLOPHORA R. Br.

T. sp

BATAN, Santo Domingo de Basco, *3835 Fénix*, with fruits only, and impossible to determine to the species at the present time

DISCHIDIA R. Br.

D. oiantha Schltr.

CAMIGUIN, *3978 Fénix*, on trees near the seashore.

Known only from the Philippines.

D. myrtillus Schltr.

CAMIGUIN, *4128 Fénix*, on trees at the summit of the volcano

Known only from the Philippines.

D. sp.
CAMIGUIN, *4102 Féniæ*, probably an undescribed species.

D. sp.
CAMIGUIN, *3934 Féniæ*, a form apparently allied to *D. platyphylla* Schltr.

HOYA R. Br.

H. benguetense Schltr.
CAMIGUIN, *4124 Féniæ*.
Known only from Luzon.

H. odorata Schltr.
BATAN, near the summit of Mount Iraya, *3789 Féniæ*.
Mountains of Luzon and Mindoro.

PERGULARIA Linn.

P. filipes Schltr.
CAMIGUIN, *4097 Féniæ*.
Known only from the Philippines.

TOXOCARPUS W. & A.

T. sp.
BATAN, Santo Domingo de Basco, *3658 Féniæ*.

CONVOLVULACEÆ.

IPOMOEA Linn.

I. pes-caprae (Linn.) Sweet.
BATAN, Santo Domingo de Basco, *3226 Mearns; 3561 Féniæ*. BABUYAN, *3905 Féniæ*. N. v., *Vadino*.
Along the seashore throughout the Philippines; tropical and subtropical coasts of the World.

I. gracilis R. Br. Prodr. (1810) 484; House in Ann. N. Y. Acad. Sci. 18^{2} (1908) 248.
I. denticulata (Desr.) Choisy, non R. Br.
SABTAN, *3732 Féniæ*. N. v., *Ditadit*.
Near the seashore throughout the Philippines; tropics of the World.

I. stolonifera (Cyrilli) Poir. in Lam. Encycl. 6 (1804) 20; House in Ann. N. Y. Acad. Sci. 18^{2} (1908) 213.
Convolvulus stoloniferus Cyrilli Pl. Rar. 1 (1788) 14.
Convolvulus littoralis Linn. Syst. ed. 10 (1759) 924, non *Ipomoea littoralis* Bl.
Convolvulus acetosaefolius Vahl Ecl. 1 (1796) 18.
Ipomoea acetosaefolia R. & S. Syst. 4 (1819) 246.
Ipomoea carnosa R. Br. Prodr. (1810) 485; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 158; Mats. & Hayata Enum. Pl. Formosa (1906) 261.
CAMIGUIN, *4091 Féniæ*, along the seashore.
Seashores of tropical and subtropical regions of the World; not previously recorded from the Philippines, and here enumerated under its oldest valid specific name.

STICTOCARDIA Hallier f.

S. tiliaefolia (Desr.) Hallier f.
FUGA, *3241 Mearns*.
Widely distributed in the Philippines; tropical Asia, Africa and America.

MERREMIA Dennst.

M. nymphaeifolia (Bl.) Hallier f.

CAMIGUIN, *4027 Fénix*.

Widely distributed in the Philippines; Mascarenes, southeastern Asia, Malaya, Australia, and Polynesia.

BORRAGINACEÆ.

EHRETIA Linn.

E. microphylla Lam.

CAMIGUIN, *4017 Fénix*, normal form. BATAN, Santo Domingo de Basco, *3623 Fénix*, a peculiar dwarfed form with small, entire or nearly entire, fascicled leaves. N. v., *Palupo*.

Throughout the Philippines; British India to Formosa and Malaya.

E. philippinensis A. DC.

CAMIGUIN, *4110 Fénix*.

Widely distributed in the Philippines; endemic.

TOURNEFORTIA Linn

T. argentea Linn. f.

FUGA, *3252*, *3253 Mearns*. BATAN, Santo Domingo de Basco, *3768 Fénix*. BABUYAN, *3894 Fénix*. CAMIGUIN, *4004 Fénix*. N. v., *Uangta*.

Along the seashore throughout the Philippines; British India to Madagascar, Formosa, Malaya, Polynesia and Australia.

T. sarmentosa Lam.

CAMIGUIN, *3949 Fénix*.

Widely distributed in the Philippines; Mauritius and Seychelles through Malaya to Formosa and Australia.

HELIOTROPIUM Linn.

H. indicum Linn.

CAMIGUIN, *3970 Fénix*. BATAN, Santo Domingo de Basco, *3700 Fénix*.

A common weed throughout the Philippines; tropical Asia, Africa and America.

VERBENACEÆ.

LIPPIA Linn.

L. nodiflora Linn.

BATAN, Santo Domingo de Basco, *3201 Mearns*; *3631 Fénix*. N. v., *Naoulad*.

A common weed in the Philippines; tropical and warm temperate regions of the World.

CALLICARPA Linn.

Callicarpa denticulata Merrill sp. nov.

Arbuscula 2 ad 3 m alta; ramulis petiolisque densissime stellato-plumoso-pubescentibus; foliis ovatis vel late elliptico-obovatis, submembranaceis, usque ad 15 cm longis, apice breviter acuminatis, basi rotundatis vel subacutis, margine regulariter dentatis, subtus parce stellato-pubescentibus, punctis glandulosis copiosis notatis; cymis axillaribus circiter 5 cm longis, plus minus stellato-pubescentibus; floribus glanduloso-punctatis; filamentis longe exsertis, circiter 6 mm longis.

A shrub 2 to 3 m high. Branches light-gray, glabrous, the branchlets very densely stellate-plumose-pubescent. Leaves submembranous, 10 to 15 cm long, 5 to 9 cm wide, ovate to broadly elliptical-obovate, the apex short-acuminate, the base rounded to subacute, rarely slightly cordate, the margins dentate, the upper surface shining, glabrous or with few stellate hairs along the nerves, the lower surface usually paler, with scattered stellate hairs and with numerous minute, yellow, shining glands; nerves 5 to 6 on each side of the midrib, very prominent, the reticulations distinct, brown; petioles 1 to 1.5 cm long, densely stellate-plumose-pubescent, in age nearly glabrous. Cymes solitary, only in the upper axils, 5 cm long or less, peduncled, dichotomous, more or less stellate-pubescent, many-flowered. Calyx cupular, 1.5 mm long, obscurely 4-toothed, with few scattered stellate hairs and also with minute yellow glands. Corolla slightly glandular and also with scattered hairs, nearly 4 mm long, widened upward, the lobes elliptical, obtuse, about 1 mm long, purplish. Stamens long-exserted; filaments about 6 mm long; anthers somewhat glandular, 1.6 mm long. Ovary depressed-globose; style very slender, 1 cm long. Fruit globose, about 3 mm in diameter.

BATAN, Santo Domingo de Basco, *Bur. Sci. 3622 Fénix*, May 30, 1907. CAMIGUIN, *4023 Fénix*. N. v., *Inaif*.

A species well characterized by its relatively broad leaves, few cymes, and these only in the upper axils, the very long-exserted stamens and style. It has more the facies of *Premna* than of *Callicarpa*.

PREMNA Linn.

P. odorata Blanco.

BATAN, Santo Domingo de Basco, *3193 Mearns*.

Known only from the Philippines, where it is common and widely distributed.

P. subglabra Merr.

CAMIGUIN, *3940 Fénix*. BATAN, Santo Domingo de Basco, *3236 Mearns*. BABUYAN, *3927 Fénix*.

Rather widely distributed in the Philippines; endemic.

P. integrifolia Linn.

FUGA, *3238 Mearns*.

The common seacoast form that has been identified with the Linnean species, common throughout the Philippines along the seashore; India to Formosa, and Malaya.

There is some doubt as to the exact identity of the Linnean species, but whether or not true *Premna integrifolia* Linn., the specimen cited above seems also to be very close to *P. laevigata* Miq., from Sumatra, and to *P. obtusifolia* R. Br., of northern Australia.

CLERODENDRON Linn.

C. intermedium Cham.

CAMIGUIN, *4145 Fénix*.

Very common and widely distributed in the Philippines; endemic, but with very closely allied forms found both in Formosa and in Celebes.

C. trichotomum Thunb. Fl. Jap. (1784) 256: Schauer in DC. Prodr. 11 (1847) 668; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 262; Mats. & Hayata Enum. Pl. Formosa (1906) 303.

BATAN, Santo Domingo de Basco, *3615 Fénix*. N. v., *Tungao*. LUZON, Province of Isabela, Casiguran, *3114 Mearns*, June, 1907.

Japan to Formosa, central and southern China; new to the Philippines.

VITEX Linn.

V. trifolia Linn.

BATAN, Santo Domingo de Basco, *3176 Mearns*.

Along the seashore throughout the Philippines, British India to Formosa, Malaya, and Australia.

V. ovata Thunb.

BATAN, Santo Domingo de Basco, *3212 Mearns; 3644 Fénix*. CAMIGUIN, *4005 Fénix*.

Common along the seashore throughout the Philippines; Japan to Formosa, southern China and Malaya Possibly not specifically distinct from the preceding.

LABIATÆ.

LEONURUS Linn.

L. sibiricus Linn.

BATAN, Santo Domingo de Basco, *3570 Fénix; 3198 Mearns*

Widely distributed in the Philippines; temperate and tropical regions of both Hemispheres, a native of the Old World

ANISOMELES R. Br

A. indica (Linn.) O. Ktze.

CAMIGUIN, *4022 Fénix*

Common and widely distributed in the Philippines; India to Formosa and Malaya.

COLEUS Lour.

Coleus pubescens Merrill sp. nov.

Herba erecta, stricta, circiter 75 cm alta; foliis utrinque densissime pubescentibus, ovatis, coriaceis, petiolatis, dentato-crenatis, acutis, 4 ad 6 cm longis; racemis circiter 20 cm longis, pubescentibus; floribus circiter 8 mm longis; calyce hirsuto, lobis lateralibus obtusis.

An erect unbranched herb about 75 cm high, rather densely pubescent. Stems angular, sulcate, pubescent, rather stout, brownish. Leaves coriaceous, ovate, 4 to 6 cm long, 3 to 4 cm wide, densely pubescent on both surfaces, the apex acute, the margins distinctly crenate-dentate, the base acute or decurrent-acuminate; nerves about 5 on each side of the midrib; petioles pubescent, 1 to 1.5 cm long. Racemes about 20 cm long, pubescent, leafy below, the flowers 10 or 12 at each node, the internodes about 1 cm long, the upper ones shorter. Pedicels slender, pubescent. Calyx hirsute, glandular, in anthesis about 3 mm long, in fruit 5 to 6 mm long, the posterior tooth elliptical-ovate, acute, the lateral ones obovate, rounded, the anterior one narrow, cleft into two lanceolate, acuminate, teeth, 1 mm long. Corolla about 8 mm long, exserted, the tube slender, abruptly bent, the anterior lobe about 2 mm long, the posterior 5 mm long; anthers 0.5 mm long. Seeds nearly 1 mm in diameter.

BABUYAN, *Bur. Sci. 3892 Fénix*, June 17, 1908, along the seashore, flowers blue.

A species possibly allied to *Coleus formosana* Hayata, but much larger, densely pubescent, and with quite differently shaped calyx-lobes. Well characterized by its coriaceous, densely pubescent leaves.

OCIMUM Linn.

O. basilicum Linn.

BATAN, Santo Domingo de Basco, *3840 Fénix*, *Petrelli s. n.* N. v., *Valanoy*.

Common in cultivation throughout the Philippines; India to China, Formosa, Malaya, and Polynesia.

LEUCAS Benth.

L. javanica Benth.

BATAN, Santo Domingo de Basco, *3625 Fénix*, a dwarfed form.

Rather common in the Philippines; Formosa to Java.

SOLANACEÆ.

PHYSALIS Linn.

P. angulata Linn.

CAMIGUIN, *4003 Fénix*. FUGA, *3240 Mearns*.

Widely distributed in the Philippines; tropical and warm regions of the World.

CAPSICUM Linn.

C. frutescens Linn.

BATAN, Santo Domingo de Basco, *3646 Fénix*. N. v., *Sili*.

Common in the Philippines; cultivated in warm and tropical regions of the World.

SOLANUM Linn.

S. cumingii Dunal.

BATAN, Santo Domingo de Basco, *3565 Fénix*. CAMIGUIN, *3935 Fénix*. N. v., *Vajusa*.

Widely distributed in the Philippines; by some authors reduced to the widely distributed and cultivated *Solanum melongena* L.

S. ferox Linn.

BATAN, Santo Domingo de Basco, *3720 Fénix*. N. v., *Camadada*.

Widely distributed in the Philippines; India to Formosa and Malaya.

S. nigrum Linn.

BATAN, Santo Domingo de Basco, *3592 Fénix*. N. v., *Nateng*.

Widely distributed in the Philippines; tropical and temperate parts of the World.

S. biflorum Lour.

BATAN, Santo Domingo de Basco, *3838 Fénix*, a form differing from the type in having from 3 to 6 flowers in each axil.

A variable species found at medium and higher altitudes from Luzon to Mindanao; southern China to Formosa, the Malay Peninsula and Archipelago.

DATURA Linn.

D. alba Nees.

BATAN, Santo Domingo de Basco, *3642 Fénix*; *3810 Mearns*. N. v., *Siva*.

Common throughout the Philippines, by some authors considered as a variety of *Datura fastuosa* Linn.; tropical Asia to southern China and Formosa.

CESTRUM Linn.

C. nocturnum Linn.

BATAN, Santo Domingo de Basco, *3707 Fénix*, cultivated.

There is some doubt as to the identity of this plant with the Linnaean species, it is possibly *C. parqui* L'Hér. Commonly cultivated in the Philippines, a native of tropical America.

SCROPHULARIACEÆ.

SCOPARIA Linn.

S. dulcis Linn.

BATAN, Santo Domingo de Basco, *3606 Fénix*. CAMIGUIN, *3968 Fénix*

Widely distributed in the Philippines; tropics of the World, a native of tropical America.

CENTRANTHERA R. Br.

C. hispida R. Br.

SABTAN, *3746 Fénix*.

Widely distributed in the Philippines; India to southern China, Malaya, and Australia

Hemsley[1] states under this species "we have referred the yellow flowered specimens to *C. Brunoniana* Wall., and the purple ones to *C. hispida* R. Br., without any confidence of their distinctness." Of the numerous sheets representing this species in our Philippine collection, all have yellow flowers, and following Hemsley's classification would be referable to *Centranthera brunoniana* Wall.

BONNAYA Link & Otto

B. veronicaefolia Spreng.

CAMIGUIN, *3960 Fénix*.

Widely distributed in the Philippines; India to Formosa and Malaya.

BIGNONIACEÆ.

RADERMACHERA Hassk

R. fenicis Merr. in Philip. Journ. Sci. 3 (1908) Bot. 335.

BATAN, Santo Domingo de Basco, *3583 Fénix*. N. v., *Balaybayan*.

Known only from this locality.

GESNERIACEÆ.

TRICHOSPORUM D. Don.

T. cardinale Copel. in Govt. Lab. Publ. (Philip.) 17 (1904) 46.

CAMIGUIN, on trees, summit of the volcano, *4139 Fénix*.

Previously known only from Mount Apo, Mindanao.

CYRTANDRA Forst.

C. cumingii Clarke.

BATAN, Santo Domingo de Basco, *3787 Fénix*.

Widely distributed in the Philippines; endemic.

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[1] *Journ. Linn. Soc. Bot.* 26 (1890) 202.

Cyrtandra umbellifera Merrill sp. nov. § *Stellatae.*

Arbuscula 1.5 m alta; foliis oblongo-ellipticis, acuminatis, subintegris vel leviter crenatis, usque ad 20 cm longis, subfalcatis, membranaceis; inflorescentiis umbellatis, axillaribus, solitariis, ferrugineo-pubescentibus, pedunculis tenuibus, circiter 1.5 cm longis; floribus circiter 1 cm longis; calycis lobis anguste acuminatis, tubo longioribus.

A shrub about 1.5 m high. Branches grayish, terete, glabrous, the branchlets pubescent. Leaves opposite, subequal, oblong-elliptical, somewhat falcate, membranous, 16 to 20 cm long, 5 to 7 cm wide, glabrous above, beneath somewhat pale and with scattered appressed hairs on the midrib and nerves, the apex rather strongly acuminate, the base acute, the margins subentire or slightly crenate; petioles pubescent, 2.5 to 3.5 cm long. Flowers umbellate, umbels solitary, axillary, their pedicels slender, about 1.5 cm long, pubescent, each umbel 6- to 10-flowered, the bracts linear-lanceolate, pubescent, about 5 mm long; pedicels slender, pubescent, 5 to 7 mm long. Calyx pubescent with short spreading hairs, the tube broad, about 2 mm long, the teeth narrowly lanceolate, long-acuminate, 3 to 4 mm long. Corolla about 1 cm long, somewhat pubescent outside. Fruit (immature) glabrous, narrowly ovoid, long acuminate.

BATAN, near the summit of Mount Iraya, *Bur. Sci. 3785 Fénix*, June 8, 1907.

A species well characterized by its umbellate inflorescence.

ACANTHACEÆ.

ERANTHEMUM Linn.

E. curtatum Clarke.

BABUYAN, *3907 Fénix*. BATAN, Santo Domingo de Basco, *3612 Fénix*. CAMIGUIN, *4072 Fénix*.

Known only from the Philippines where it is rather widely distributed.

JUSTICIA Linn.

J. procumbens Linn.

BATAN, *3602, 3688 Fénix; 3199, 3200 Mearns*, luxuriant forms.

Widely distributed in the Philippines; India and Ceylon to Formosa, Malaya, and Australia.

BLECHUM P. Br.

B. brownei Juss.

BATAN, *3663 Fénix*.

A common and widely distributed weed in the Philippines, a native of tropical America; Formosa, fide Clarke in lit.

RUBIACEÆ.

DENTELLA Forst.

D. repens (Linn.) Forst.

BATAN, *3665 Fénix*.

Widely distributed in the Philippines in waste places; tropical Asia to Formosa through Malaya to Australia.

OLDENLANDIA Linn.

O. paniculata Linn.

Batan, *3195 Mearns; 3627 Fénix*. Babuyan, *3966 Fénix*.

A common and widely distributed weed in the Philippines; British India to Formosa, Malaya and Polynesia.

HEDYOTIS Linn.

H. radicans (Bartl.) Miq. Fl. Ind. Bat. 2 (1856) 181.

Metabolus radicans DC. Prodr. 4 (1830) 435.

Sclerococcus radicans Bartl. Herb. ex DC. l. c.

Batan, Mount Iraya, *3799 Fénix*.

Known only from the Philippines; the specimen cited above agrees closely with the original specimen, which I have examined in Herb. Prague.

OPHIORRHIZA Linn.

O. mungos Linn.

Batan, Santo Domingo de Basco, *3682 Fénix*. Sabtan, *3749 Fénix*. Babuyan, *3914 Fénix*. Camiguin, *3964, 4082 Fénix*.

British India to the Malay Peninsula, Java, Sumatra and the Philippines; not reported from China or Formosa.

ARGOSTEMA Wall.

A. solaniflorum Elm. Leafl. Philip. Bot. 1 (1906) 2.

Batan, near Mount Iraya, *3790 Fénix*, a luxuriant form.

A species of doubtful value, described from Luzon material; no representative of the genus is reported from Formosa or China.

WENLANDIA Bartl.

W. brachyantha Merr.

Batan, Santo Domingo de Basco, *3723 Fénix; 3189, 3208 Mearns*. Camiguin, *4120 Fénix*.

Luzon; doubtfully distinct from *W. glabrata* DC.

UNCARIA Schreb.

U. setiloba Benth. in Hook. Lond. Journ. Bot. 2 (1843) 223; Havil. in Journ. Linn. Soc. Bot. 33 (1897) 85.

U. florida Vid. Phan. Cuming. Philip. (1885) 176; Mats. & Hayata Enum. Pl. Formosa (1906) 182.

Camiguin, *4052 Fénix*.

Formosa, the Philippines, and Amboina.

SARCOCEPHALUS Afzel.

S. orientalis (Linn.) comb. nov.

Cephalanthus orientalis Linn. Sp. Pl. (1753) 95.

Nauclea orientalis Linn. Sp. Pl. ed. 2 (1762) 243.

Nauclea cordata Roxb. Fl. Ind. 1 (1820) 509.

Sarcocephalus cordatus Miq. Fl. Ind. Bat. 2 (1856) 133; Havil. in Journ. Linn. Soc. Bot. 33 (1897) 27.

Camiguin, *3992 Fénix*.

Widely distributed in the Philippines; British India to Ceylon, southern China, Malaya, Polynesia, and northern Australia.

The oldest specific name is here adopted for this common and widely distributed species. Linnaeus[1] first cites Fl. Zeyl. 53, in his description of the species, but adds other references, at least one of which represents a different species. Trimen[2] however, states under *Sarcocephalus cordatus* Miq., "Hermann's drawing (there is no specimen) is certainly this; which fixes Linnaeus's *Nauclea orientalis* as originally the same."

NAUCLEA Linn.

N. reticulata Havil.

Batan, Santo Domingo de Basco, *3670 Fénix.*

Known only from the Philippines.

MUSSAENDA Linn.

M. macrophylla Wall.

Batan, *3770 Fénix.* Camiguin, *3985 Fénix.* Babuyan, *3920 Fénix.*

British India to the Malayan Peninsula, the Philippines and Formosa.

The exact identity of the Philippine forms referred to this species is doubtful.

RANDIA Houst.

R. whitfordii Merr.

Camiguin, *4056 Fénix.*

Previously known only from Luzon.

VILLARIA Rolfe.

V. littoralis Vidal.

Gardenia elliptica Elm. Leafl. Philip. Bot. 1 (1906) 6.

Camiguin, *4002 Fénix.* Batan, Santo Domingo de Basco, *3811 Fénix; 3137 Mearns.* Babuyan, *3896 Fénix.*

Widely distributed in the Philippines; endemic.

GUETTARDA Linn.

G. speciosa Linn.

Sabtan, *3760 Fénix.* Fuga, *3243 Mearns.*

Common along the seashore throughout the Philippines; coasts of tropical Asia, eastern Africa, northern Australia, Malaya, and Polynesia, but not known from Formosa.

PAVETTA Linn.

P. indica Linn.

Camiguin, *3982, 4060 Fénix.* Sabtan, *3748 Fénix,* glabrous forms.

Widely distributed in the Philippines, variable; India to Formosa, Malaya and northern Australia.

IXORA Linn.

I. macrophylla Bartl.

Camiguin, *4080 Fénix.*

Widely distributed in the Philippines; endemic.

I. coccinea Linn.

Camiguin, *3988, 4096 Fénix.* Sabtan, *3767 Fénix.* Fuga, *3256 Mearns.* Batan, Santo Domingo de Basco, *3662 Fénix.*

Widely distributed in the Philippines; variable; some forms cultivated for ornamental purposes; India and Malaya, not known from China or Formosa.

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[1] Sp. Pl. (1753) 95.

[2] Fl. Ceyl. 2 (1894) 292.

PSYCHOTRIA Linn.

Psychotria cephalophora Merrill sp nov.

Arbuscula erecta, glabra; foliis membranaceis vel submembranaceis, elliptico-oblongis vel obovato-ellipticis, utrinque *acuminatis*, *11* ad *15* cm longis, nervis utrinque circiter 13; fructibus glabris, 5 mm longis, pedicellatis, in capitula globosa, 2.5 cm diametro congestis.

An erect glabrous shrub, the branches gray, terete, the branchlets brown, lenticellate, terete or slightly compressed. Leaves membranous or submembranous, elliptical-oblong or ovate-elliptical, 11 to 15 cm long, 5 to 7 cm wide, glabrous, the base somewhat acuminate, the apex rather abruptly and sharply acuminate; nerves prominent on both surfaces, about 13 on each side of the midrib, parallel, somewhat curved, the reticulations indistinct; petioles 1.5 to 2 cm long. Flowers unknown. Fruit obovoid, smooth, glabrous, not ridged, about 5 mm long, the pedicels about 5 mm long, arranged in a rather dense terminal globose head about 2.5 cm in diameter; seeds hemispherical, not ridged.

Camiguin, in forests, *Bur. Sci. 4048 Fénix*, June 27, 1907.

A species well characterized by its congested inflorescence, forming, in fruit, a terminal subglobose head about 2.5 cm in diameter.

P. manillensis Bartl.

Babuyan, *3908 Fénix*. Batan, *3648 Fénix*, typical forms, agreeing with the type in Herb. Prague.

Known only from the Philippines where it is not uncommon.

GEOPHILA Don.

G. herbacea (Jacq.) O. Ktz.

Batan, Santo Domingo de Basco, *3816 Fénix*.

Tropics of the World.

LASIANTHUS Jack.

L. obliquinervis Merr.

Camiguin, *4074 Fénix*.

Rather widely distributed in the Philippines, endemic.

PAEDERIA Linn.

P. tomentosa Blume.

Batan, Santo Domingo de Basco, *3221 Mearns*, *3701 Fénix*.

Common and widely distributed in the Philippines; eastern India to Japan and Formosa, the Malay Peninsula and Archipelago.

MORINDA Linn.

M. bracteata Roxb.

Camiguin, *3979 Fénix*. Sabtan, *3736 Fénix*.

Very common and widely distributed in the Philippines; tropical Asia, Malaya and northern Australia.

M. parvifolia Bartl. in DC. Prodr. 4 (1830) 449.

M. cumingiana Vid. Phan. Cuming. Philip. (1885) 184.

Lucinaea cumingiana Vid. l. c. 216; Rev. Pl. Vasc. Filip. (1886) 152.

Babuyan, *3924 Fénix*. Camiguin, *4119 Fénix*.

I have examined the type of Bartling's species in Herb. Prague, which was from Luzon, and *Cuming 1242*, in Herb Kew, the type of Vidal's species, which was from the Province of Ilocos Norte, Luzon, and consider them to be identical and a *Morinda* rather than *Lucinaea* The same form is found in Formosa Koshun *Kawakami 1624*, distributed as *Psychotria serpens* Linn

Luzon to Formosa

SPERMACOCE Dill

S. hispida Linn

BATAN, Santo Domingo de Basco 3708 *Fénix*

Throughout the Philippines, India to Formosa and Malaya

CUCURBITACEÆ

TRICHOSANTHES Linn

T. quinquangulata A Gray

CAMIGUIN, *3989 Fénix*

Widely distributed in the Philippines endemic

MELOTHRIA Linn

M indica Lour var

BATAN, Santo Domingo de Basco, *3694 Fénix* N v *Simoncaram*

Widely distributed in the Philippines India to China and Malaya

COMPOSITÆ

VERNONIA Schreb

V patula (Dryand)

Conyza patula Dryand in Ait Hort Kew 3 (1789) 184

Conyza chinensis Lam Encycl 2 (1790) 83 non Linn

Cyanthillium pubescens Blume Bijdr (1826) 890

Cyanthillium villosum Blume l c 889

Vernonia albicans DC in Wight Contrib (1834) 6 Prodr 5 (1836) 26

Vernonia chinensis Less Linnaea 6 (1831) 105 674 Hook f Fl Brit Ind 3 (1881) 235 Forbes & Hemsl in Journ Linn Soc Bot 23 (1888) 401 non *Conyza chinensis* Linn

BATAN Santo Domingo de Basco, *3599 Fénix*

A common weed throughout the Philippines Formosa southern China Malaya and India

The commonly used specific name for this species *chinensis* is invalid being based on *Conyza chinensis* Lam non Linn and accordingly what is apparently the earliest valid specific name for the species is here adopted The name *patula* has been used in *Vernonia* by Martius, but only as a synonym and does not prevent the adoption of Dryander's specific name for the present species

Conyza chinensis Lam is manifestly this species and not the same as *C chinensis* Linn, although the exact identity of the latter is doubtful From the original description I suspected that Linnaeus really described the species here considered to be *Vernonia patula* but this seems to be not the case

The Linnean Herbarium does not clear up the matter as at my request Mr B Dayton Jackson, Secretary of the Linnean Society kindly examined the original specimens, and under the date of June 15 1908 writes as follows "There are three sheets pinned together by Linné himself (1) Two specimens of the same plant, a *Blumea* with the note Suratt At foot of sheet in L's handwriting '*Conyza chinensis*' (2) A single specimen which matches your specimen (*Vernonia chinensis* Less), at the heel of it is written Ard which means Arduino, a ticket in Arduino's handwriting is attached thus —No 27 an *Serratula glauca* tua. L. has added *Conyza chinensis* and at the foot of the sheet *chinensis*. (3) Left hand scrap resembling a *Pluchea*, right hand a small specimen, at heel, *indica* apparently the same as No. 1."

The Linnean herbarium therefore contains under *Conyza chinensis*, at least three species, but probably none of these is the actual type, for Linnaeus cites only "Habitat in China, Toren." However, Arduino's specimen was apparently received by Linnaeus after the publication of the Species Plantarum, as indicated by the query "an *Serratula glauca* tua," and so can not possibly be the type of the species, even in part. As this is the only specimen of *Vernonia chinensis* in the Linnean Herbarium, it seems probable that Linnaeus' *Conyza chinensis* is really a *Blumea*.

Vernonia maritima sp. nov.

Planta parva, suffruticosa, 10 ad 20 cm alta; foliis alternis, spatulatis, oblongo-spatulatis, vel anguste oblongo-ellipticis, 1.5 ad 3 cm longis, 5 ad 10 mm latis, utrinque plus minus dense scarioso-pubescentibus, vix tomentosis, integris vel supra obscure dentatis, apice acutis vel breviter acuminatis. Capitulis longe pedunculatis, circiter 5 mm longis latisque; bracteis lanceolatis, acuminatis, plus minus scariosis, interioribus majoribus.

A small erect or diffuse usually much branched suffrutescent plant 10 to 20 cm high. Stems and branches brownish, more or less pubescent. Leaves alternate, spatulate, oblong-spatulate or narrowly oblong-elliptical, coriaceous, 1.5 to 3 cm long, 5 to 10 mm wide, on both surfaces more or less densely scariose-pubescent, not tomentose, usually narrowed toward the base, the apex acute or short acuminate, entire or above somewhat dentate; nerves about 3 on each side of the midrib; petioles 1 cm long or less, pubescent. Inflorescence a terminal few-flowered panicle, the peduncles 1 to 1.5 cm long, sometimes less, with scattered linear bracteoles. Heads about 5 mm long and wide; involucral bracts several-seriate, the outer ones much smaller than the inner, lanceolate, acuminate, somewhat scariose, the inner ones equaling the flowers. Flowers many, homogamous, the disk flat, somewhat fimbriate. Achenes oblong, usually somewhat curved, 4-angled, glabrous, 1.5 mm long, the pappus hairs few, deciduous, white, scabrid, 1.5 mm long. Corolla tubular, slender, 3 mm long, the lobes 1.2 mm long. Anthers 1.2 mm long. Style-arms 0.5 mm long.

BABUYAN, on rocks near the sea, *Bur. Sci. 3925 Fénix*, June, 1907. A very similar form, with immature flowers is represented by *no. 3620*, from Batan Island.

A species apparently allied to the preceding, but quite distinct in size, habit and indumentum.

ELEPHANTOPUS Linn.

E. spicatus (Cass.) Juss.

BATAN, Santo Domingo de Basco, *3685 Fénix*.

A common weed throughout the Philippines, introduced from tropical America; also found in Japan and Formosa.

E. mollis H. B. K.

CAMIGUIN, *4090 Fénix*. BATAN, Santo Domingo de Basco, *3[illegible]7 Fénix*.

Like the preceding, common throughout the Philippines and introduced from tropical America.

ADENOSTEMMA Forst.

A. viscosum Forst.

CAMIGUIN, *3972 Fénix*.

A common weed throughout the Philippines; tropics of the World.

AGERATUM Linn.

A. conyzoides Linn.

CAMIGUIN, *3974 Fénix*. BATAN, Santo Domingo de Basco, *3608 Fénix*.

A common weed throughout the Philippines; tropical and subtropical regions of the World.

ERIGERON Linn.

E. linifolius Willd.

BATAN, Santo Domingo de Basco, *3673 Fénix*, *3181 Mearns*.

Widely distributed in warm and tropical regions of the World.

SPHAERANTHUS Linn.

S. africanus Linn.

CAMIGUIN, *3968 Fénix*.

A common weed in the Philippines; tropical Africa, Asia, Malaya, and Australia.

SIEGESBECKIA Linn.

S. orientalis Linn.

BATAN, Santo Domingo de Basco, *3178 Mearns*, *3671 Fénix*.

Throughout the Philippines, usually at medium altitudes; tropical and subtropical regions of the World.

ECLIPTA Linn.

E. alba (Linn.) Hassk.

BATAN, Santo Domingo de Basco, *3633 Fénix*, *3183*, *321[illegible] Mearns*. CAMIGUIN, *3952 Fénix*.

WEDELIA Jacq.

Wedelia biflora (Linn.) DC.

BATAN, Santo Domingo de Basco, *36[illegible] Fénix*, *3180 Mearns*. CAMIGUIN, *3914 Fénix*. BABUYAN, *3938 Fénix*.

Along the seashore throughout the Philippines; tropical Asia, Malaya, and Polynesia.

BIDENS Linn.

B. pilosa Linn.

BATAN, Santo Domingo de Basco, *3601 Fénix*, *3179 Mearns*. CAMIGUIN, *4086 Fénix*.

A common weed throughout the Philippines; tropical and subtropical regions of the World.

ARTEMISIA Linn.

A. vulgaris Linn.

BATAN, Santo Domingo de Basco, *3618 Fénix*, *3184*, *3185 Mearns*.

Introduced from Europe, occasionally cultivated in the Philippines and frequently spontaneous; widely distributed in temperate and warm regions of the World.

GYNURA Cass.

G. elliptica Yabe & Hayata in Journ. Coll. Sci. Tokyo 18 (1904) 25, *pl.* 2.

BATAN, Santo Domingo de Basco, *3691 Fénix*. SABTAN, *Petrelli*, s. n.

Previously known only from Formosa, the specimens cited above agreeing well with the description and plate.

EMILIA Cass.

Emilia sonchifolia (Linn.) DC.

BATAN, Santo Domingo de Basco, *3146, 3180, 3182 Mearns; 3593 Fénix*. CAMIGUIN, *4020 Fénix*.

A widely distributed and variable weed in the Philippines; warm and tropical parts of the Old World, introduced into the New.

LACTUCA Linn.

L. dentata (Thunb.) C. B. Robins. in Philip. Journ. Sci. 3 (1908) Bot. 218.

BATAN, Santo Domingo de Basco, *3645 Fénix*.

Throughout the Philippines at higher altitudes; Japan and Formosa.

L. squarrosa (Thunb.) Miq. Ann. Mus. Lugd.-Bat. 2 (1866) 189.

Prenanthes squarrosa Thunb. Fl. Jap. (1784) 303.

Prenanthes laciniata Houtt. Nat. Hist. 28 (1779) 381, *t. 66, f. 1*, non *Lactuca laciniata* Roth.

Lactuca laciniata Makino in Bot. Mag. Tokyo 17 (1903) 88, non Roth.

Lactuca brevirostris Champ. in Hook. Kew Journ. 4 (1852) 237.

BATAN, Santo Domingo de Basco, *3674 Fénix*.

Northern India to Manchuria, Japan, Formosa, southern China and the Philippines.

CREPIS Linn.

Crepis japonica (Linn.) Benth.

BATAN, Santo Domingo de Basco, *3187, 3146a Mearns*.

Widely distributed in the Philippines at medium and higher altitudes; Japan to southern China, India and Australia.

ERRATA.

Page 44, line 23, for **Parodiella pumila** read **Parodiella puncta.**
Page 122, before **IPOMOEA** insert CONVOLVULACEÆ.
Page 256, line 8, for oblongo-ovatis read oblongo-obovatis.
line 15, for oblong-ovate read oblong-obovate.
Page 266, line 32, for *Nauclea clavisepala*, read *Uncaria clavisepala.*
Page 295, line 29, for Féé read Fée.
Page 297, line 24, for *D. sylvatica* read *D. sylvaticum.*
Page 305, line 21, for R. Br. read DC.
Page 315, line 7, for *F. luzonensis* Warb. read *F. luzonensis* Presl.

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